1
SAFETY / EMISSIONS

# SAFETY / EMISSIONS INDEX

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# SAFETY / EMISSIONS
# OCCUPANT PROTECTION SYSTEMS
# SEAT RESTRAINT SYSTEM

## GENERAL INFORMATION

The following recommendations are intended to assist in the design of seats and seat belt systems capable of meeting the requirements of the F/CMVSS 207, 208, 209 and 210 except for front seating positions for vehicles having a GVWR of 3855 kg [8500 lb] or less, and an Unloaded Vehicle Weight of 2495 kg [5500 lb] or less. These recommendations are based on testing and analyses performed by Ford Motor Company.

Ford Motor Company cautions subsequent stage manufacturers to note the definition of “Designated Seating Positions” in Definitions. If a position can reasonably be used by a 5th percentile adult female for seating and the overall seat configuration and vehicle design make it likely that the position will be used by an occupant while the vehicle is in motion, then the position must be considered to be a “Designated Seating Position” for determination of compliance to U.S. and Canadian Motor Vehicle Safety Standards.

Seat and seat belt systems may take many forms; this list of recommendations cannot cover all possibilities. Strict adherence to these suggestions will not ensure that systems will comply with F/CMVSS 207, 208, 209 and 210. Responsibility for determining compliance to appropriate F/CMVSS regulations is that of the final stage manufacturer. Accordingly, Ford Motor Company makes no representation as to the appropriateness of any particular recommendation in its specific application of a particular design or act of intermediate or final stage manufacture.

To confidently verify compliance with F/CMVSS 207, 208, 209 and 210, the testing of representative systems to applicable F/CMVSS 207, 208, 209 and 210 procedures is recommended. Questions regarding compliance with F/CMVSS regulations should be directed to your legal counsel, the National Highway Traffic Safety Administration, or Transport Canada.

## SEAT SYSTEMS

1. For Incomplete E-Series and Transit vehicles purchased with the front seat delete option, Ford Motor Company strongly recommends following the practices specified in the Incomplete Vehicle Manual (IVM) compliance representations for F/CMVSS 208.
2. Any additional seats and seat anchorages installed by subsequent stage manufacturers must meet F/CMVSS 207 requirements and specifications.
3. Do not modify or alter Ford Motor Company furnished seating or occupant restraint system. When utilizing the Ford Motor Company driver’s seat delete package, care must be taken to insure proper function of the seat adjustment latching mechanism, electrical wiring and seat belt buckle pretensioner. Refer to seat wiring SVE Bulletin Q-48 “Seat and Restraint System Wiring Routing” or the latest revision for wiring routing. E-Series ordered with Passenger Seat Delete, Air Bag Delete, or RH Door Delete option may have the vehicle wiring modified according to resistor and bracket SVE Bulletin Q-93 “E-Series Front Passenger Seat/Pedestal/Restraint Delete Options – New Resistor and Bracket” or the latest revision.
4. If the seat or seat belt components are temporarily removed for any reason, they must be re-installed IN THE SAME VEHICLE in accordance with the instructions and specifications found on the following pages or the applicable Ford Truck Shop Manual.
5. Seating systems that include the attachment of lap belt or shoulder belt assemblies should also consider the requirements of F/CMVSS 210 as part of the seating system.
6. Seating system components should be free of sharp edges to prevent damage to seat belt systems when the belts could potentially contact the seating system components.
7. Seats should be mounted with appropriate fasteners in the mounting holes provided, since these holes are located to utilize floor pan structural reinforcements.
8. If additional holes are required for any reason, their locations should be carefully selected so that the structural integrity of the floor pan will not be compromised and to prevent damage to other components located below the floor. Refer to SVE Bulletin Q-192 “Recommended Practices and Processes for Vehicle Modifications Requiring Seat /Seat Restraint System Removal/Assembly” or the latest revision.
9. Seating systems should be designed to be compatible with the seat belt systems, so as to permit proper adjustment, allow for occupant movement and provide convenient accessibility of the restraint system buckle release.
10. Seats not designated for occupancy while the vehicle is in motion must be conspicuously labeled as such.
11. Any additional seats, flip/folding seats or otherwise modified seats must not interfere with the design performance of installed side curtain or seat side airbags.

**WARNING:**
Ford Motor Company safety belts are designed to work with the seats originally designed for the vehicle. If a modifier uses different seats with Ford Motor Company seat belts, that modifier must ensure the safety belts and replacement seats meet all FMVSS requirements and will perform safely in the field. Failure to do so could result in serious injury in the event of a collision.

## LAP AND SHOULDER BELT SYSTEMS

1. The front seats are equipped with a pyrotechnic buckle pretensioner. The buckle pretensioner reduces slack in the lap and shoulder safety belt by pulling the buckle downward. The buckle pretensioners and air bags operate on the same sensors and will function simultaneously.
2. Additional lap and shoulder belt assemblies, including retractors and hardware, must comply with the requirements of F/CMVSS 208 and 209.3.
3. Additional lap and shoulder belt system anchorages must comply with the requirements of F/CMVSS 210.
4. Lap and shoulder belt systems that are attached to seat frame or base may affect compliance of the seating system with the requirements of F/CMVSS 207.
5. Ford Motor Company lap and shoulder belts, retractors and attaching hardware should not be altered or modified in any way. The re-installation of these components should follow the instructions and specifications in the appropriate Ford Truck Shop Manual.
6. Lap and shoulder belt assemblies should be compatible with the seat systems and anchorages so that lap belts will be properly positioned about the occupant’s pelvis to provide proper adjustment and fit. The buckle and buckle release are properly located with respect to the occupant and must comply with the requirements of F/CMVSS 208.
7. Seat belt warning system activation/deactivation, where applicable, should be provided by the lap and shoulder belt assembly.

**WARNING:**
The seat belt buckle pretensioner, air bags and electronic sensor module are barcoded with **a unique serial number which is matched to the vehicle VIN**. To maintain the occupant protection system performance, the completed vehicle must contain the same seat belt buckle pretensioner, air bags and electronic sensor module that were installed by Ford Motor Company. Failure to do so could result in serious injury in the event of a collision.

## OCCUPANT PROTECTION ZONE AND OVERHEAD CONSOLE

For vehicles completed with an Unloaded Vehicle Weight (UVW) greater than 2495 kg [5500 lb], Ford Motor Company strongly recommends following the practices in the compliance representations for F/CMVSS 208 regarding overhead console specifications that apply to vehicles with a GVWR of 3856 kg [8500 lb] or less and completed units have an Unloaded Vehicle Weight of 2495 kg [5500 lb] or less.

# SAFETY / EMISSIONS
# OCCUPANT PROTECTION SYSTEMS
# AIRBAG SUPPLEMENTAL RESTRAINT SYSTEM

## GENERAL INFORMATION

Ford Motor Company urges careful consideration of the recommendations that follow. They are based on analyses of component and vehicle tests, actual service situations, and engineering judgments. Disregard of these recommendations may affect the durability, reliability, handling and performance characteristics of a completed vehicle and may result in elevated underbody temperatures, increase the potential for fire, or may affect the safety of the occupants in the event of an accident.

These recommendations are supplemental to U.S. and Canadian Motor Vehicle Safety Standards compliance representations provided in the Incomplete Vehicle Manual (IVM). Also, additional information is provided in the Ford Truck Service Manual which may be helpful to subsequent stage manufacturers.

The completed vehicle in the “Loaded” condition must not exceed the front GAWR, rear GAWR or the GVWR. (“Loaded” means the completed vehicle weight with the maximum fluid capacity necessary for vehicle operation, plus 150 lb for each designated seating position, and an additional allowance for any cargo weight advertised by the manufacturer). The GAWR and GVWR are on the label affixed to the cover of the Incomplete Vehicle Manual. Subsequent Stage Manufacturers are encouraged to contact the Ford Truck Body Builder Advisory Service if they have any questions concerning these recommendations.

## AIRBAG SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

Some trucks produced by Ford Motor Company are equipped with an Airbag Supplemental Restraint System (SRS). System components are shown in their vehicle locations on the following pages.

Detailed system and service information will be found in the Ford Truck Service Manual for the appropriate type and model year. Ford Motor Company urges the subsequent stage manufacturers to become familiar with this system prior to modifying vehicles that are so equipped.

If electrical work is performed in the steering column area, the instrument panel of the air bag system, the system must be deactivated to avoid unwanted inflation of the air bag. To do this, follow the procedure described on this page.

**CAUTION:**

Do not remove the steering column, steering wheel, and air bag module as an assembly from the vehicle unless:

(1) The column is locked to prevent rotation, or
(2) The lower end of steering shaft is secured (e.g., by wire) in such a way that the steering wheel cannot be rotated.

**WARNING:**

The seat belt buckle pretensioner, air bags, and electronic sensor module are barcoded with a unique serial number which is matched to the vehicle VIN. To maintain the occupant protection system performance, the completed vehicle must contain the same seat belt buckle pretensioner, air bags, and electronic sensor module that were installed by Ford Motor Company. Failure to do so could result in serious injury in the event of a collision.

**WARNING:**

To avoid accidental deployment and possible personal injury, the backup power supply must be depleted before repairing or replacing any air bag supplemental restraint system (srs) components. To deplete the backup power supply energy, disconnect the battery ground cable and wait one minute. be sure to disconnect auxiliary batteries and power supplies (if equipped).

**WARNING:**

Carry a live air bag module with the air bag and trim cover pointed away from your body. This will reduce the risk of injury in the event of an accidental deployment.

**WARNING:**

Do not set a live air bag module down with the trim cover face down.

## DEACTIVATION PROCEDURE

1. Disconnect all negative battery cable(s), and power supplies (if equipped).
2. Wait 1 minute. This is the time required for backup power supply in diagnostic monitor to deplete its stored energy.
3. Remove fasteners retaining driver air bag module to steering wheel. Disconnect driver air bag connector and remove the bag from steering wheel. Place the air bag on a flat surface with trim cover facing upward. Connect an Air Bag Simulator (Part # 105-R0012 in the Rotunda Tool catalog) to the airbag connector on the wire harness in the steering wheel.
4. Disconnect passenger air bag module connector and replace it with an Air Bag Simulator (Part # 105-R0012 in the Rotunda Tool catalog) to the air bag connector on the wire harness in the I/P.
5. Reconnect all negative battery cables and power supplies (if equipped).

## REACTIVATION PROCEDURE

1. Disconnect all negative battery cable(s) and power supplies (if equipped).
2. Wait 1 minute for backup power supply to deplete stored energy.
3. Remove Air Bag Simulator and reconnect driver air bag connector. Position driver airbag on steering wheel and secure with fasteners (10 mm). Tighten fasteners to 2.7-3.7 Nm [24-32 in lb].
4. Remove Air Bag Simulator and reconnect passenger airbag connector.
5. Reconnect all negative battery cables and power supplies (if equipped).
6. PROVE-OUT the system.

## PROVE-OUT SYSTEM PROCEDURE

“Prove-out” the system means to turn the ignition switch from OFF to RUN and visually monitor the air bag indicator. The air bag will light continuously for approximately six seconds and then turn off. If an air bag system fault is present, the indicator will either fail to light, remain lit continuously or light in a flashing manner. The flashing manner may not occur until approximately 30 seconds after the ignition switch has been turned from OFF to RUN. This is the time required for the diagnostic monitor to complete the testing of the air bag system. If the air bag indicator is inoperative and an air bag system fault exists, a tone will sound in a pattern of five sets of five beeps. If this occurs, the air bag indicator will need to be serviced before further diagnosis can be done.

## E-SERIES ORDERED WITH PASSENGER SEAT / AIR BAG / DOOR DELETE OPTIONS

An E-Series vehicle with the Passenger Seat Delete option, RH Door Delete option, or Air Bag Delete option will have a seat/air bag delete resistor/bracket installed in the front outboard seat pedestal's mounting hole. The builder may need to relocate the resistor/bracket in order to provide a “clear” cab floor in the passenger seat area. It is suggested the following procedure be used:

1. Remove the resistor/bracket from current mounting hole.
2. Detach the wire harness from rear of cab floor.
3. Remove the pushpin from the bracket and enlarge the mounting hole so that the bracket will slip over the M12 stud.
4. Route and neatly bundle the wire harness under driver's seat pedestal.
5. Attach the resistor/bracket over outboard rear driver’s pedestal mounting stud **using an additional M12 nut** (not provided) to retain the resistor/bracket. **Do not install the bracket under the nut retaining the seat pedestal.**

**NOTE:**

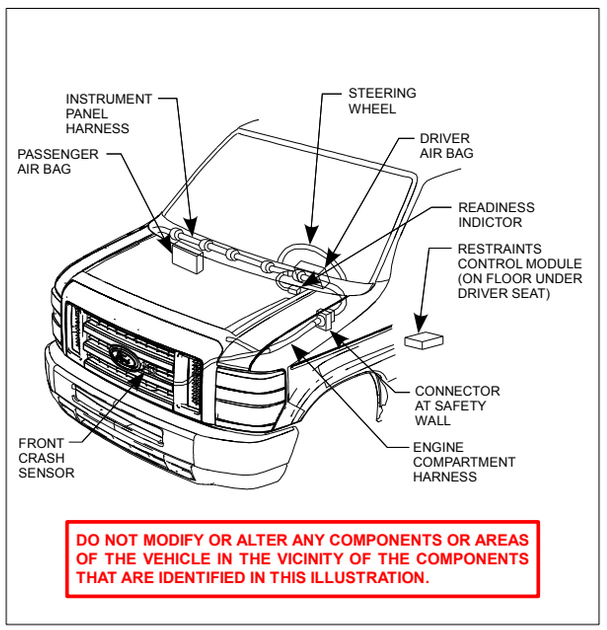
If bundling the wire harness results in an undesirable packaging condition, shorten the harness by cutting, splicing with appropriate butt connectors, and protecting with convolute as necessary. Refer to SVE Bulletin Q-93 published on the website www.fleet.ford.com/truckbbas.

(Cont'd next page)

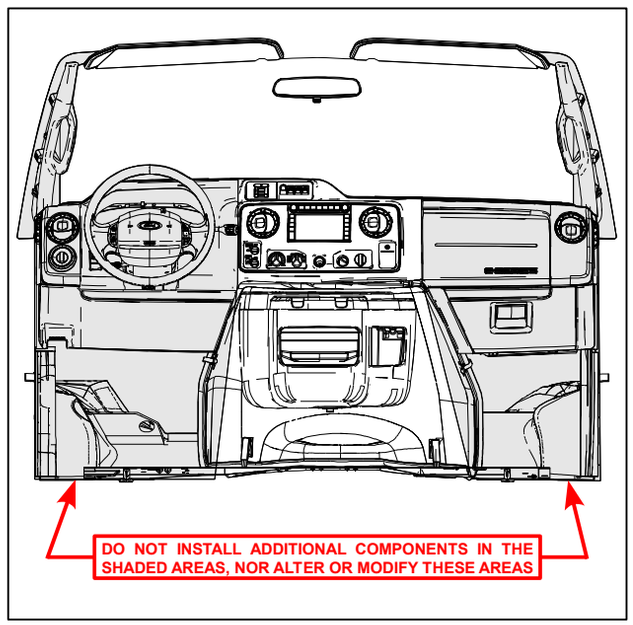
# SAFETY / EMISSIONS
# OCCUPANT PROTECTION SYSTEMS
# AIR BAG SUPPLEMENTAL RESTRAINT SYSTEM (Cont'd)

| VEHICLE | DRIVER AIR BAG | PASSENGER AIR BAG |
|---|---|---|
| Transit Connect | Front, Side, Curtain | Front, Side, Curtain |
| Transit Wagon | Front, Side, Curtain | Front, Side, Curtain |
| Transit Van / Cutaway / Chassis Cab (See Order Guide for optional airbag delete configurations) | Front, Side, Curtain | Front, Side, Curtain (Includes front cut-off switch) |
| E-Series Cutaway | Front | Front |
| E-Series Stripped Chassis | — | — |
| F-150 | Front, Side, Curtain | Front, Side, Curtain (Includes deactivation sensor) |
| Super Duty F-Series Pickup | Front, Side, Curtain | Front, Side, Curtain (Includes deactivation switch) |
| Super Duty F-Series Pickup Box Delete and Chassis Cab | Front, Side, Curtain | Front, Side, Curtain (Includes deactivation switch) |

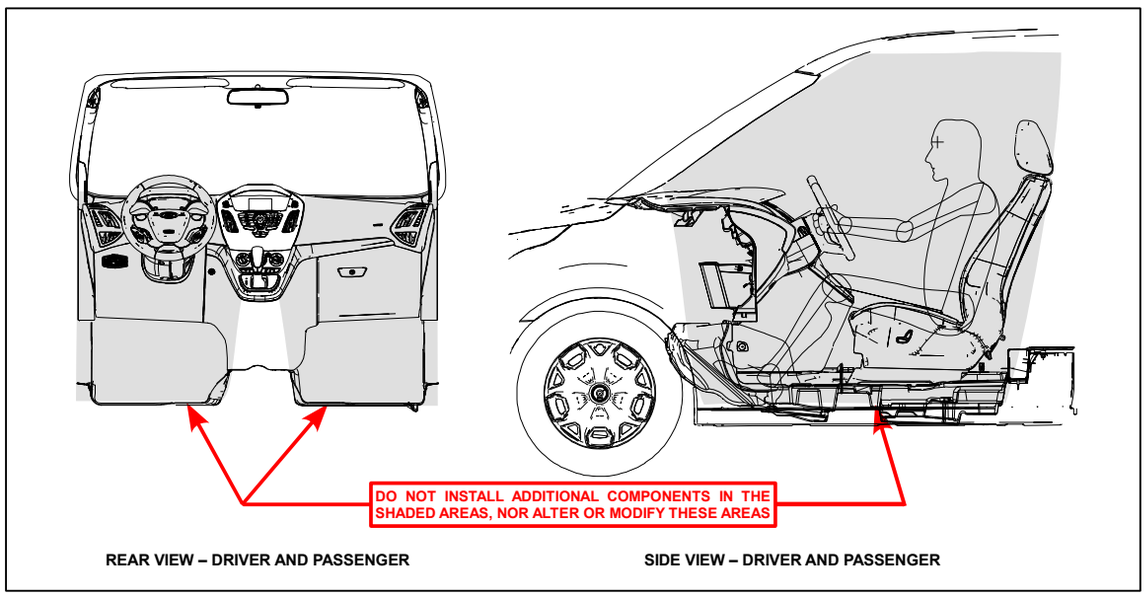
E-Series Cutaway vehicles equipped with Passenger Seat Delete Option - refer to SVE Bulletin Q-93 published on the website www.fleet.ford.com/truckbbas. The Bulletin provides instructions on relocating resistor/bracket from passenger seat area to driver seat area.


INSTRUMENT PANEL HARNESS
STEERING WHEEL
PASSENGER AIR BAG
DRIVER AIR BAG
READINESS INDICTOR
RESTRAINTS CONTROL MODULE (ON FLOOR UNDER DRIVER SEAT)
CONNECTOR AT SAFETY WALL
FRONT CRASH SENSOR
ENGINE COMPARTMENT HARNESS
DO NOT MODIFY OR ALTER ANY COMPONENTS OR AREAS OF THE VEHICLE IN THE VICINITY OF THE COMPONENTS THAT ARE IDENTIFIED IN THIS ILLUSTRATION.

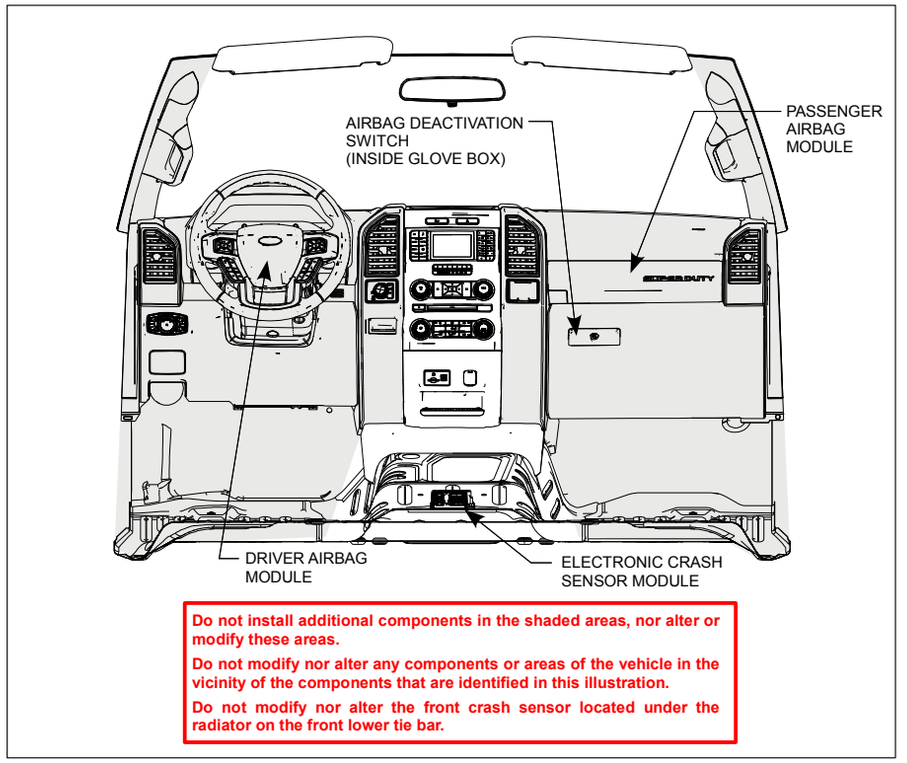
**E-SERIES SUPPLEMENTAL RESTRAINT SYSTEM (AIR BAGS, SENSORS, AND WIRING)**




**E-SERIES OCCUPANT PROTECTION ZONE**


DO NOT INSTALL ADDITIONAL COMPONENTS IN THE SHADED AREAS, NOR ALTER OR MODIFY THESE AREAS
REAR VIEW – DRIVER AND PASSENGER
SIDE VIEW – DRIVER AND PASSENGER

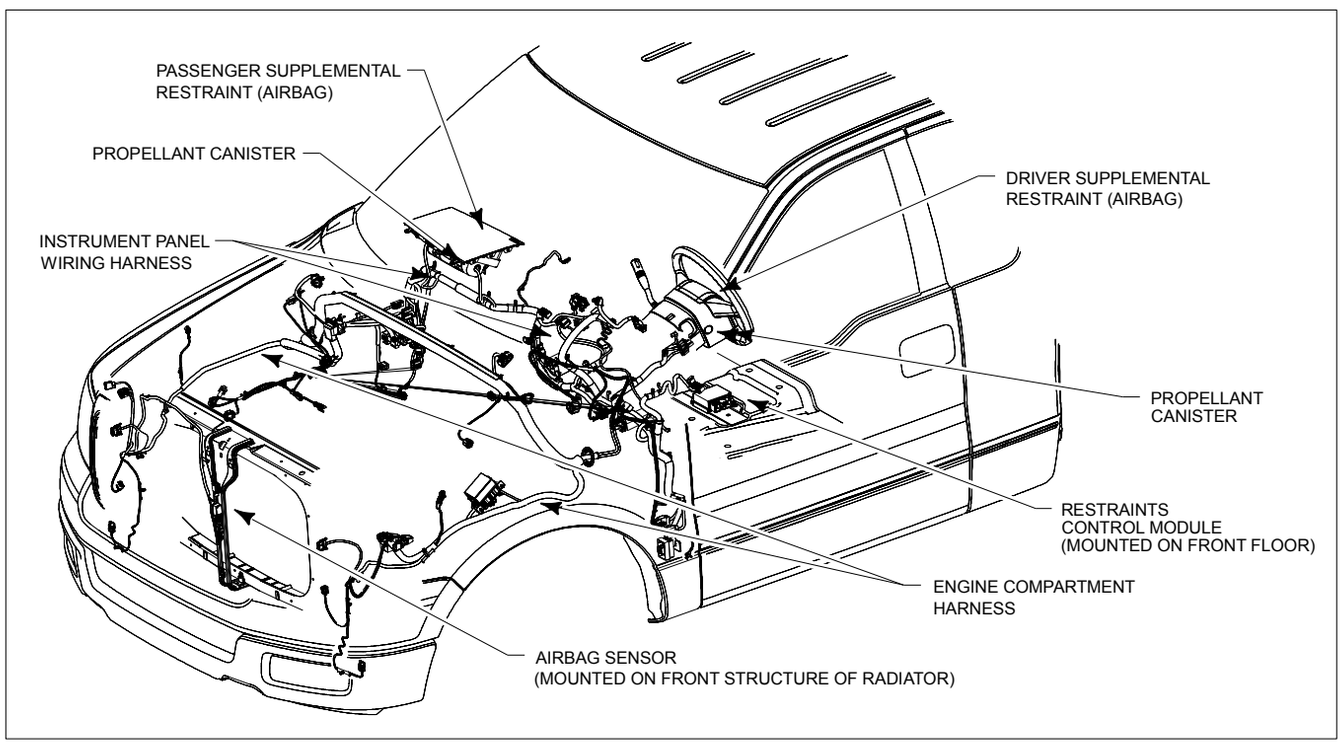
**TRANSIT CONNECT OCCUPANT PROTECTION ZONE**
**(SIDE VIEW TYPICAL FOR ALL VEHICLES WITH SIDE & CURTAIN AIRBAGS)**


AIRBAG DEACTIVATION SWITCH (INSIDE GLOVE BOX)
PASSENGER AIRBAG MODULE
DRIVER AIRBAG MODULE
ELECTRONIC CRASH SENSOR MODULE
Do not install additional components in the shaded areas, nor alter or modify these areas.
Do not modify nor alter any components or areas of the vehicle in the vicinity of the components that are identified in this illustration.
Do not modify nor alter the front crash sensor located under the radiator on the front lower tie bar.

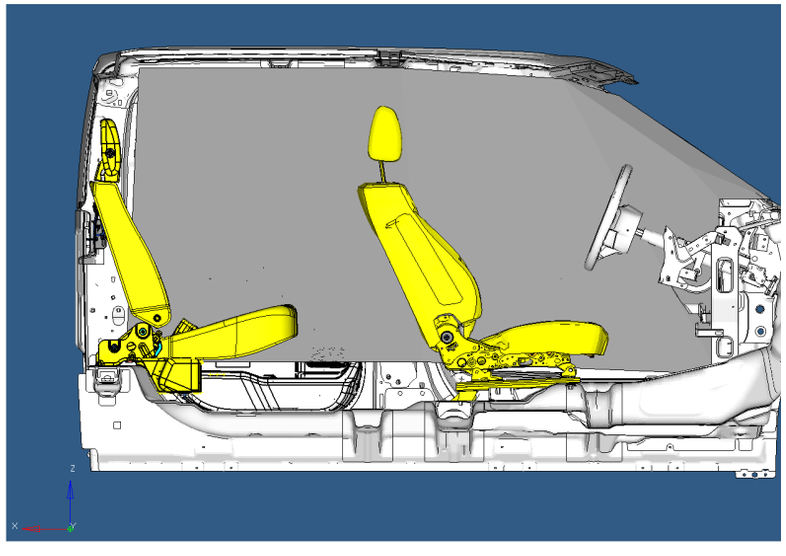
**F-SERIES OCCUPANT PROTECTION ZONE & SUPPLEMENTAL RESTRAINT SYSTEM (AIR BAGS, SENSORS AND WIRING)**

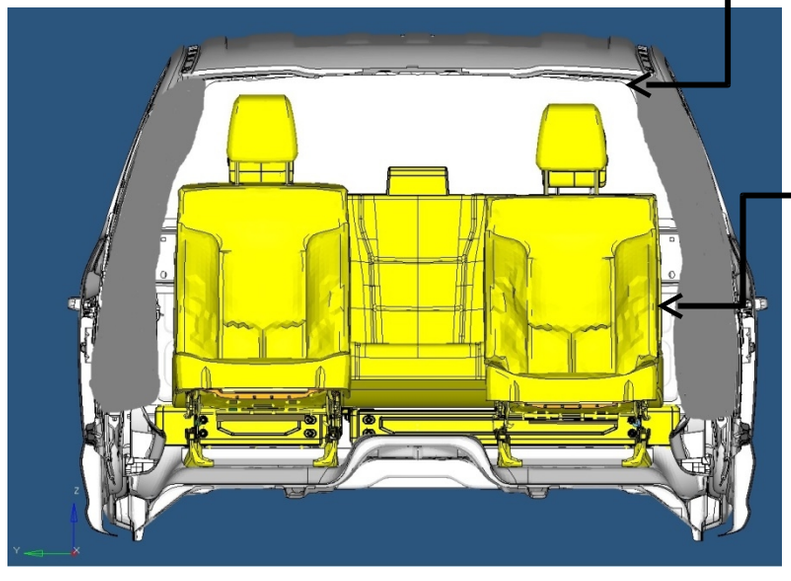
(Cont'd next page)

# SAFETY / EMISSIONS
# OCCUPANT PROTECTION SYSTEMS
# AIR BAG SUPPLEMENTAL RESTRAINT SYSTEM (Cont'd)


PASSENGER SUPPLEMENTAL RESTRAINT (AIRBAG)
PROPELLANT CANISTER
INSTRUMENT PANEL WIRING HARNESS
DRIVER SUPPLEMENTAL RESTRAINT (AIRBAG)
PROPELLANT CANISTER
RESTRAINTS CONTROL MODULE (MOUNTED ON FRONT FLOOR)
ENGINE COMPARTMENT HARNESS
AIRBAG SENSOR (MOUNTED ON FRONT STRUCTURE OF RADIATOR)

**F-SERIES SUPPLEMENTAL RESTRAINT SYSTEM (AIRBAGS, SENSORS AND WIRING)**






**F-SERIES AIRBAG SUPPLEMENTAL RESTRAINT SYSTEM –
NOT TO BE REMOVED, RELOCATED, MODIFIED NOR ALTERED**

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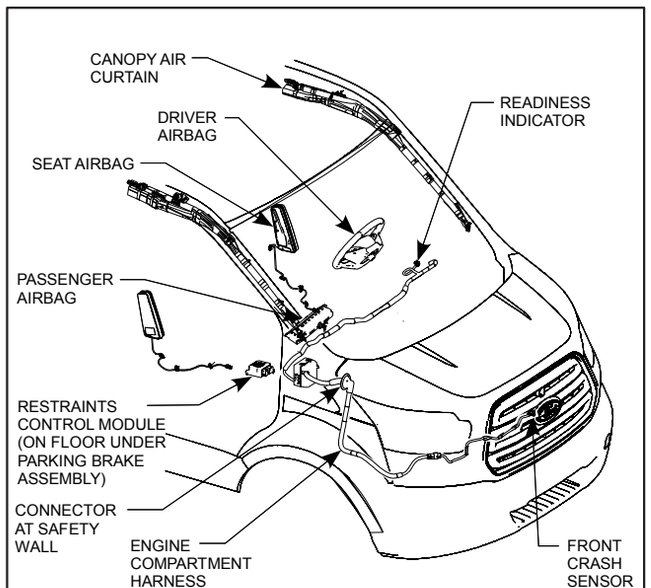
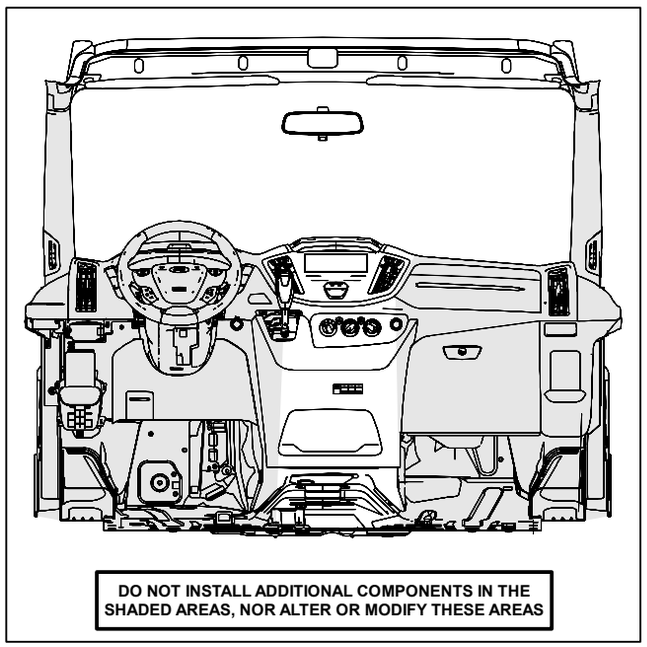
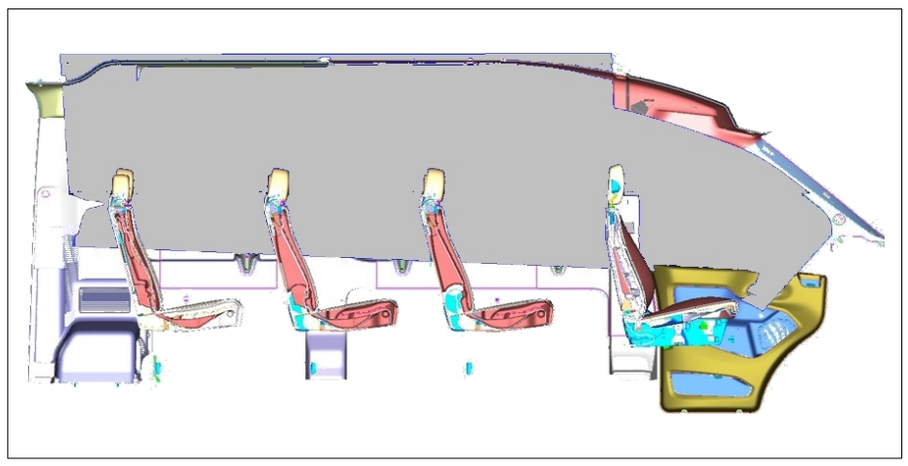
# SAFETY / EMISSIONS
# OCCUPANT PROTECTION SYSTEMS
# AIR BAG SUPPLEMENTAL RESTRAINT SYSTEM (Cont'd)


CANOPY AIR CURTAIN
DRIVER AIRBAG
SEAT AIRBAG
READINESS INDICATOR
PASSENGER AIRBAG
RESTRAINTS CONTROL MODULE (ON FLOOR UNDER PARKING BRAKE ASSEMBLY)
CONNECTOR AT SAFETY WALL
ENGINE COMPARTMENT HARNESS
FRONT CRASH SENSOR
DO NOT MODIFY OR ALTER ANY COMPONENTS OR AREAS OF THE VEHICLE IN THE VICINITY OF THE COMPONENTS THAT ARE IDENTIFIED IN THIS ILLUSTRATION.

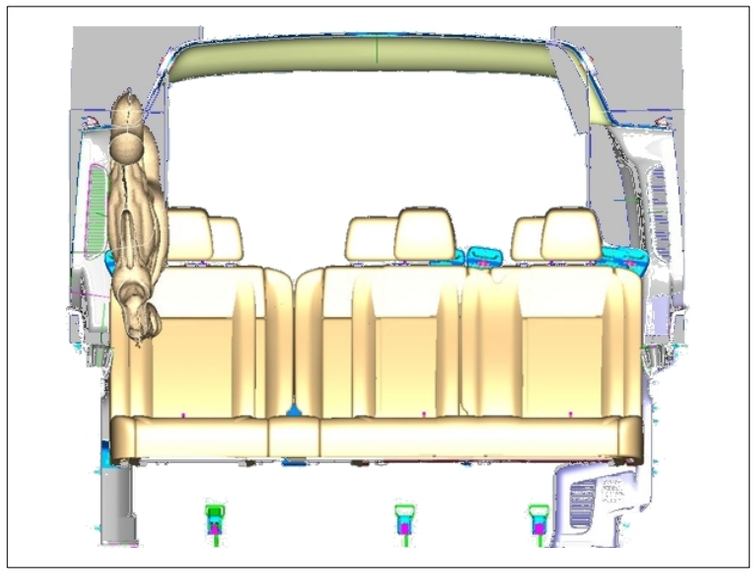
**TRANSIT SUPPLEMENTAL RESTRAINT SYSTEM**
**(Air Bags, Sensors, and Wiring)**




**TRANSIT OCCUPANT PROTECTION ZONE**



**TRANSIT OCCUPANT PROTECTION ZONE (TYPICAL)**



**TRANSIT OCCUPANT PROTECTION ZONE**

# SAFETY / EMISSIONS
# VEHICLE NOISE REGULATIONS & EMISSION CONTROL MODIFICATIONS



## EXTERIOR

The U.S. Federal Government, the Canadian Federal Government, and some states, provinces and municipalities have enacted a variety of noise control laws and regulations which apply to motor vehicles sold or operating within their jurisdictions. Sales representatives should become familiar with the various sales and user regulations, as required, to alert the individual purchaser. Moreover, the individual purchaser should check and become aware of any applicable regulations. The individual purchaser should be sure that the specifications of the vehicle, as ordered, are appropriate in view of those sales and user noise regulations applicable to the purchase and anticipated use of that vehicle.

Although vehicles which have GVWRs over 4536 kg (10,000 lb) are designed to comply with Federal Interstate Motor Carrier Noise Emissions Standards, 49 CFR §325, Ford Motor Company does not represent compliance with this standard under numerous and varying conditions under which such vehicles may be operated.

Furthermore, Ford Motor Company does not represent compliance of any school bus, stripped chassis or chassis-cowl type vehicles with any noise control law or regulation. Vehicle noise varies with the number of tires on total vehicle combination, tire tread pattern, vehicle load, tire wear and road surface condition.

Vehicles, to which alterations or additions are made that may increase noise emissions, must be ascertained to comply with the applicable noise standards after modifications have been completed by the vehicle modifiers.

## EXTERIOR NOISE REGULATIONS APPLICABLE TO SALE OF NEW VEHICLES

The U.S. Environmental Protection Agency (EPA) noise emission standards for medium and heavy trucks in excess of 4536 kg (10,000 lb) GVWR (40 CFR §205.52) preempts, with certain exceptions, all those state and local noise regulations that are applicable to the sale of such new vehicles, and are not identical to the Federal standards. These Federal standards, which set a maximum sound emission level 80 dB(A), as measured by the prescribed procedure, are effective in all states, the District of Columbia, Puerto Rico, Virgin Islands, American Samoa, Guam and the Trust Territory of the Pacific Islands. These Federal standards do not apply to school buses which are required to meet 80 dB(A) in a number of local jurisdictions. They also do not apply to trucks not having a partially or fully enclosed operator's compartment (for example stripped chassis). (See 40 CFR §205.50, "Applicability" and pertinent definitions in §205.51. See 40 CFR §205.55-1 (b) for when incomplete vehicles being completed become subject to the Federal standard.)

## SPECIFICATIONS FOR INTERIOR NOISE WHEN BMCS (INTERSTATE COMMERCE) SERVICE IS INDICATED

The Federal Interstate Motor Carrier interior noise standard (49 CFR §393.94) is applicable to all motor carrier vehicles. This standard requires that the interior sound level at the driver's seating position of any such vehicle not exceed 90 db(A), when measured in accordance with the test procedure in 49 CFR §393.94 (c).

Ford Motor Company does not represent that stripped chassis or cutaway vehicles manufactured by Ford Motor Company comply with the Federal Interstate Motor Carrier interior noise standard.

Vehicles subjected to alterations or additions, which may increase interior sound levels, must be ascertained to comply with the interior noise regulation after the modifications have been completed by the vehicle modifiers.

## CANADIAN INTERIOR SOUND LEVEL REQUIREMENT

Trucks and buses over 4536 kg (10,000 lb) GVWR manufactured for use in Canada must meet the interior sound level requirement of the Canada Motor Vehicle Safety Standards (CMVSS) (Section 1106 (5)) which specifies that the interior sound level at the driver's seating position shall not exceed 90 db(A), as measured in accordance with the test procedure set forth in subsection 5 of CMVSS 1106 (4).

Ford Motor Company does not represent that stripped chassis or cut-away vehicles manufactured by Ford Motor Company comply with the Canadian interior noise standard.

## RADIO FREQUENCY INTERFERENCE (RFI)

All vehicles powered by spark ignition engines (e.g.: gasoline or propane engines) that are manufactured by Ford in Canada or for sale or use in Canada are designed to be capable of compliance with the Canadian "Regulations for the Control of Interference to Radio Reception" per Interference Causing Equipment Standard ICES-002, when tested in according to CAN/CSA-C108.4-06 "Limits and Methods of Measurement". A written notice, in the form of a label, must be affixed to the vehicle to indicate compliance. With respect to incomplete vehicles, Ford has no control over how an incomplete vehicle is completed by subsequent stage manufacturers. Therefore, Ford does not represent that the completed vehicle incorporating the Ford-built components will comply with those requirements. Any ignition system component that is replaced would be re-placed by the same Ford Motor Company part number or equivalent, to maintain RFI suppression.

**While there are currently no RFI regulations in the United States specifically applicable to automotive ignition systems, all Ford Medium Trucks are built with ignitions system components the same or equivalent to those supplied on Canadian vehicles. Ford Motor Company recommends that all ignition system service be performed at a Ford authorized service facility to help hold RFI emission levels to a minimum.**

Devices that emit radio frequency (RF) energy such as AM/FM radios, mobile telecommunications systems (two-way radios, telephones), and radio-controlled security systems are subject to the rules and regulations of the Federal Communications Commission (FCC) 47 CFR Parts 2 and 15. Any such system installed in a vehicle should comply with those rules and should be installed only by a qualified technician. In addition, to insure continued compliance with the FCC's regulations, RF devices must not be modified or changed in a manner not expressly approved by Ford Motor Company.

Mobile communication systems, particularly if not properly installed, may adversely affect the operation of the vehicle. For example, such systems, when operated, may cause the engine to stumble or stall. In addition, such systems themselves may be damaged or their operation affected by the operation of the vehicle. (Citizens Band (CB) transceivers, garage door openers, and other transmitters whose power output is 5 watts or less, ordinarily will NOT affect vehicle operation.)

Because Ford has no control over the operation or manufacture of such systems or their installation, Ford cannot assume responsibility for any adverse effects or damage if this equipment is used.

## NOISE CONTROL MODIFICATIONS

All new Ford Motor Company trucks over 4536 kg (10,000 lb) GVWR (other than stripped chassis) manufactured for use in the United States are designed to comply with the U.S. Environmental Protection Agency's Medium and Heavy Truck Noise Emission Standards (40 CFR Part 205). Information pertinent to these noise emission standards appears in the *Ford Truck Owners Guide* and *Maintenance Schedule and Record Log* supplied with each Ford Motor Company vehicle. Sections of the *Ford Truck Owners Guide* that specifically relate to the Federal noise regulations are:

1. A statement entitled "Tampering with Noise Control System Prohibited," prescribed by Environmental Protection Agency regulation (40 CFR §205.58-2(b)), and a list of acts, commission of any of which may be presumed to constitute tampering (Tampering List).
2. Instructions for the maintenance, use and repair of the vehicle to minimize noise emission degradation *.
3. A section reserved for recording what maintenance was done, by whom, where and when.

* *For trucks powered by diesel engines, the engine manufacturer's operation and maintenance manual, supplied with the vehicle, should also be consulted.*

In planning vehicle modifications, the Tampering List should be consulted to identify those parts or systems where the alteration or removal is likely to affect the truck's compliance with the Noise Emission Standards. In addition, prospective modifications not mentioned in the Tampering List may increase the noise emissions of the truck to an impermissibly high level. The Federal regulations require regulated trucks, completed by a subsequent-stage manufacturer for use in the United States, to conform to these standards. The Federal Noise Control Act of 1972, as amended, provides civil penalties for distribution in commerce by a manufacturer of non-complying trucks, and criminal penalties where such distribution is willful or knowing. Advice concerning compliance with noise regulations should be obtained from your legal counsel.

A compliance label (see sample) is affixed to each Ford Motor Company truck regulated by the Federal Noise Regulations (except stripped chassis).

VEHICLE NOISE EMISSION CONTROL INFORMATION

FORD MOTOR COMPANY

The Vehicle Conforms to U.S. Regulations for Noise Emission Applicable to Medium and Heavy Trucks.

The Following acts or the causing thereof by any person are prohibited by the Noise Control Act of 1972:
(A) The removal or rendering inoperative, other than for purposes of maintenance, repair or replacement, of any noise control device or element of design (listed in the owner's manual) incorporated into this vehicle in compliance with the Noise Control Act; (B) The use of this vehicle after such device or element of design has been removed or rendered inoperative.

'Month and Year of Mfr.'
SAMPLE

(Cont'd next page)

# SAFETY / EMISSIONS
# VEHICLE NOISE REGULATIONS &
# EMISSION CONTROL MODIFICATIONS (Cont'd)



## EMISSION CONTROL MODIFICATIONS

All new Ford Motor Company trucks, vehicles, and engines are certified by the U.S. Environmental Protection Agency and/or by the California Air Resources Board (CARB) for compliance with applicable government emission control regulations. A copy of the appropriate *Ford Truck Owners Guide* or *Operator's Manual and Warranty Facts Booklet* must be installed in every vehicle prior to sale to the ultimate purchaser in order to provide emission systems warranty and maintenance schedules.

**CAUTION:**

Vehicles manufactured by Ford Motor Company may be emission certified for registration in specific areas of the United States. For example, **vehicles certified and labeled for sale in California may not be sold in states that require Federally certified vehicles and vehicles certified to Federal standards may not be sold in states that require California certified vehicles**. It is the subsequent stage manufacturer's responsibility to purchase a vehicle certified for the state/area in which the vehicle will be sold. EPA has stated that, under certain circumstances, they will not enforce these requirements. For further guidance, consult EPA's "Policy on Cross Border Sales of California Vehicles."

Modifications, revisions or removal of components may affect the emissions certification status of the vehicle and could cause the body builder, installer or any other subsequent modifier to be considered a manufacturer for purposes of emissions certification, warranty and recall. Modification of the emission control system may result in civil or criminal liability under Federal, state, or provincial law. To avoid any question of certification coverage, approval of any modification, revision or removal of components should be sought from the Environmental Protection Agency, California Air Resources Board or Canadian Department of Transportation, as applicable. Advice concerning compliance with applicable standards and regulations should be obtained from your legal counsel.

## EMISSION COMPLIANCE

When ordering a vehicle, the body builder must ensure that the vehicle emissions system purchased complies with appropriate emission regulations. Failure to order such a vehicle could result in the inability to register the vehicle in the area of intended use. Examples of areas requiring specific emissions certification are Altitude, SLA-Civil, California, Federal and states adopting California Emissions Regulations.

## FUEL VAPOR RECOVERY

The California Air Resources Board has adopted regulations "Specifications for Fill Pipes and Openings of Motor Vehicle Fuel Tanks" requiring that all 1977 and later model year gasoline-powered motor vehicles offered for sale in that state meet certain specifications for fill pipes and fuel tank openings.

## CURB WEIGHT AND FRONTAL AREA RESTRICTIONS

Vehicle modifiers that add weight to a vehicle or increase the frontal area of a vehicle prior to sale and delivery to the ultimate purchaser may be considered manufacturers for emission purposes (including responsibility for emissions warranty, recall and in-use compliance) and may be required to re-certify the vehicle for compliance with applicable Federal or California emissions standards.

Some heavy-duty incomplete vehicles are certified using chassis certification protocol and will require vehicle weight and frontal area restrictions (to retain emission certification). If your vehicle is affected, the frontal area and unloaded vehicle weight information will be found on the VECI label, which is located in the engine compartment. Incomplete vehicles with engines certified using heavy-duty engine protocol are not limited by weight and frontal area restrictions for exhaust emissions.

**E-Series:**

The following Frontal Area and Maximum Completed Curb Weight (MCCW = chassis + SUB + full fuel/fluids) restrictions apply to the E-Series completed vehicle:

- **6.2L E-350/450** (Max MCCW less than or equal to 5670 kg [12,500 lb]:
  - **– Without** optional sales code **15F**:
    - ■ Max frontal area – 6.69 m 2 [72 ft$^2$]
  - **– With** optional sales code **15F** *(requires SUB forward edge radius restrictions):*
    - ■ Max frontal area – 7.34 m 2 [79 ft$^2$]
- **6.8L E-350** (Max MCCW less than or equal to 5216 kg [11,500 lb]:
  - **–** 4.10 rear axle:
    - ■ Max frontal area – 6.01 m 2 [64.75 ft$^2$]
  - **–** 4.56 rear axle **without** optional sales code **15D**:
    - ■ Max frontal area – 6.69 m 2 [72 ft$^2$]
  - **–** 4.56 rear axle **with** optional sales code **15D** *(requires SUB forward edge radius restrictions):*
    - ■ Max frontal area – 7.62 m 2 [82 ft$^2$]
- **6.8L E-450 –** No frontal area restriction

**Enhanced Frontal Area Limitation Optional Sales Codes 15D** and **15F** require corner radius restrictions defined as follows:

- **Simple Box**: requires 60 mm [2.4 in] minimum corner radius on the top and forward side edges of the SUB.
- **Box Extension Over Cab**: requires 60 mm [2.4 in] minimum corner radius on the forward top edge of the SUB and 60 mm [2.4 in] average minimum corner radius on forward side and bottom edges of box extension over cab.

For additional information, reference SVE Bulletin Q-246 "Updated 2017-2018MY E-Series Cutaway / Stripped Chassis Frontal Area and Weight Restrictions" or the latest revision.

**Super Duty F-Series:**

The following Frontal Area and Maximum Completed Curb Weight (MCCW = chassis + SUB + full fuel/fluids) restrictions apply to the Super Duty F-Series completed vehicle:

- **6.2L with Pickup Box Delete option** [NOTE: Export vehicles use U.S. Emissions]
  - – Max GVWR less than or equal to 4536 kg [10,000 lb]:
    - ■ Max curb weight – 4309 kg [9500 lb]
    - ■ Max frontal area – 5.11 m$^2$ [55 ft$^2$]
  - – Max GVWR greater than 4536 kg [10,000 lb]:
    - ■ Max curb weight – 4763 kg [10,500 lb]
    - ■ Max frontal area – 5.11 m$^2$ [55 ft$^2$]
- **6.2L Chassis Cab** [NOTE: Export vehicles use U.S. Emissions]
  - – Max GVWR less than or equal to 4536 kg [10,000 lb]:
    - ■ Max curb weight – 4309 kg [9500 lb]
    - ■ Max frontal area – 6.69 m$^2$ [72 ft$^2$]
  - – Max GVWR greater than 4536 kg [10,000 lb]:
    - ■ Max curb weight – 4763 kg [10,500 lb]
    - ■ Max frontal area – 6.69 m$^2$ [72 ft$^2$]
- **6.7L with Pickup Box Delete option** [NOTE: Euro II / Euro III emissions not affected by restrictions]
  - – Max GVWR less than or equal to 4536 kg [10,000 lb]:
    - ■ Max curb weight – 4309 kg [9500 lb]
    - ■ Max frontal area – 3.76 m$^2$ [41.0 ft$^2$]
  - – Max GVWR greater than 4536 kg [10,000 lb]:
    - ■ Max curb weight – 4763 kg [10,500 lb]
    - ■ Max frontal area – 4.74 m$^2$ [51.0 ft$^2$]

**Note**: Frontal area requirement includes the cab and second unit body. The completed vehicle must meet Maximum UVW weight for a GVWR of 4536 kg [10,000 lb] or less.

For additional information, reference SVE Bulletin 257 "Updated 2017MY F-Series Pickup Box Removal/Delete and Chassis Cab Frontal Area and Weight Restrictions" or the latest revision.

**Transit:**

Completed 3.2L diesel, 3.5 EcoBoost and 3.7L Vans and Wagons certified to California > 3856 kg [8500 lb] Medium Duty Vehicle (MDV) protocol may have curb weight and frontal area restrictions shown on the VECI label, which is located in the engine compartment.

The following Frontal Area and Maximum Completed Curb Weight (MCCW = chassis + SUB + full fuel/fluids) restrictions apply to the Transit Chassis Cab and Cutaway completed vehicle:

- **3.2L Diesel Engine –**
  - ≤10,000 lb GVWR: 60 ft$^2$, max 8550 lb MCCW
  - >10,000 lb GVWR: 72 ft$^2$, max 9140 lb MCCW
- **3.7L Gasoline Engine –**
  - **SRW:**
    - 55 ft$^2$, max 6950 lb MCCW
  - **DRW:**
    - ≤10,000 lb GVWR, 60 ft$^2$, max 7550 lb MCCW
    - >10,000 lb GVWR, 66 ft$^2$, max 8140 lb MCCW

**Note:** Frontal area requirement includes the cab and second unit body (SUB). The completed vehicle must meet Maximum UVW weight for a GVWR of 4536 kg [10,000 lb] or less.

(Cont'd next page)

# SAFETY / EMISSIONS
# VEHICLE NOISE REGULATIONS &
# EMISSION CONTROL MODIFICATIONS (Cont'd)



**VEHICLES (14,000 LB OR LESS) CERTIFIED FOR SALE, REGISTRATION OR USE IN CALIFORNIA**

Modifications to passenger cars, trucks, and vehicles (14,000 lb GVWR or less) intended for sale, registration, or use in California will be deemed to be within the original emissions certification only if such modifications do not:

1. Increase vehicle weight more than 10 percent above the curb weight, increase frontal area more than 10 percent, or result in a combination increase of weight plus frontal area of more than 14 percent; or
2. Include changes in axle ratio, tire size, or tire type resulting in changes in the drivetrain ratio of more than 5 percent; or
3. Include any modification to the emission control system.

Modified vehicles that do not satisfy these conditions may not be sold to an ultimate purchaser, offered or delivered for sale to an ultimate purchaser, or registered in California unless the modified vehicle is certified by the California Air Resources Board pursuant to applicable emissions requirements. The vehicle modifier is responsible for obtaining such certification. Refer to *"California 2001 Through 2014 Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2009 Through 2016 Model Greenhouse Gas Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles", (H) - Certification, Information and Reporting Requirements, (1.3) - Scope of Certification.*

**IMPORTANT:**

The information above is provided as guidance only. Vehicle modifiers are responsible for compliance with applicable emissions regulations, including recertification if necessary.

Modifiers should refer to the document referenced above for additional guidance. Questions regarding the above requirements should be directed to your legal counsel, the EPA, or the California Air Resources Board. **In no case can vehicle weight exceed the UVW as shown in the Maximum UVW Tables shown in the E-Series, and Super Duty F-Series sections without recertifying, as applicable, for F/CMVSS 105, 135, 204, 208, 212, 214, 216a, 219, 301, and 303.**

Incomplete vehicles using engines which are certified as heavy-duty engines will not have frontal area or curb weight restrictions based on exhaust emissions regulations. It is important, however, that the final stage manufacturer observe vehicle restrictions from vehicle safety requirements, etc., which are located in the *Incomplete Vehicle Manual*.

**WARNING:**

Any modification should not cause a vehicle to fit into a different weight class (see Safety/Emissions section for a discussion against revising GAWR). Doing so may require recertification to both FMVSS and Emissions Standards. Also, this type of change voids Ford Motor Company's warranty.

Modifications not specified by Ford Motor Company, such as changes to the exhaust system, tire size, axle ratio, fuel system, etc., could adversely affect emissions performance of the vehicle and require emissions recertification by the modifier. More details are shown below.

**LIGHT-DUTY TRUCKS / MEDIUM-DUTY TRUCKS / SOME HEAVY-DUTY TRUCKS – CHASSIS CERTIFIED** [1/2/]

Includes Super Duty F-Series and F-150 completes and some incompletes up to 14,000 lb GVWR certified to the chassis certification provisions of 40 CFR, Part 86, Subpart S, and the requirements & restrictions of Subpart S apply.

Examples of emission related parts:

- Engine Assembly
- Air Intake System including Air Cleaner, Duct, Valve, Heat Stove, and Cold Air Inlet Tube
- All EGR, Catalytic Converter(s), Thermactor, or any other emission control system components[3/4/]
- Transmission including Vacuum Control System
- Axle Ratio
- Tire Size (other than available options)
- Fuel Delivery Lines/Hoses/Connector[5/]
- Fuel Tank (including Refueling/Vent Valves and Gaskets/Seals[5/6/]
- Fuel Economy Rating (as printed on vehicle invoice as applicable[7/]
- Diesel Selective Catalytic Reduction (SCR) system
- Fuel Vapor Lines/Hoses/Connectors[5/]
- Canister Purge Valve and related wiring in engine compartment or adjacent thereto
- Fuel Filler Pipe/Assembly with Fuel Cap or Capless Easy Fuel Filler Pipe Assembly (including Recirculation Line and Orifice)[5/6/8/]
- Carbon Canister(s)
- Exhaust Inlet and Outlet Pipe and Attaching Nuts[8/]
- Exhaust System Joint Clamps/Suspension/Bracket Assemblies[3/]
- Muffler[3/4/]
- Tailpipe[3/4/]
- Vehicle Emission Control Information Label[2/9/]

**HEAVY/MEDIUM–DUTY ENGINE VEHICLES – GASOLINE POWERED AND DIESEL POWERED – ENGINE CERTIFIED** [1/2/5/9/]

Includes incomplete all vehicles from 8500-14,000 lb and over 14,000 lb GVWR, both Federal Heavy-Duty and California Heavy/Medium-Duty Vehicle categories.

Examples of emission related parts:

- Engine Assembly[10/]
- Fuel System
- Air Intake System, including Air Cleaner, Duct, Valve, Heat Stove, and Cold Air Inlet Tube
- All EGR, Catalytic Converter(s), Thermactor or any other emission control system components[3/4/]
- Diesel Selective Catalytic Reduction (SCR) system
- Exhaust Inlet and Outlet Pipes[3/4/]
- Muffler[3/4/]
- Tailpipe[3/4/]
- Important Engine Information Label
- Vehicle Emission Control Information Label[2/]
- All gasoline-powered units require an evaporative emission control system. Damage to or mislocation of any of the following elements of the evaporative emission control system may render the system inoperative, may invalidate the vehicle emission control system certification, and may result in the release of flammable gasoline fumes.
- Fuel Tank (including Refueling/Vent Valves and Gaskets/Seals)[5/6/]
- Fuel Filler Pipe Assembly with Fuel Cap or Capless Easy Fuel Filler Pipe Assembly (including Recirculation Line and Orifice)[5/6/8/]
- Fuel Delivery Lines/Hoses/Connectors[5/]
- Fuel Vapor Purge Line[5/]
- Carbon Canister(s)
- Canister Purge Valve and related wiring in engine compartment or adjacent thereto
- Vehicle Emission Control Label[9/]

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# SAFETY / EMISSIONS
# VEHICLE NOISE REGULATIONS &
# EMISSION CONTROL MODIFICATIONS (Cont'd)



**Emission Control Modifications Footnote – Gasoline and Diesel Powered Vehicles**

1) For important information regarding radio frequency interference (RFI), see Electrical Wiring, General Practices. Note particularly that Canada has RFI regulations.

2) Additional requirements-

**EMISSION CONTROL INFORMATION LABEL**

To meet United States Environmental Protection Agency regulations, the Vehicle Emission Control Information (VECI) and Important Engine Information (IEI) labels must be affixed in a location that is readily visible after installation and in such a manner that it cannot be removed without destroying or defacing the label. The label shall not be affixed to any equipment that is easily detached from such vehicle.

When VECI and IEI labels are supplied, but not attached to the vehicle, they must be permanently mounted in a readily visible location to meet the preceding requirements. In addition, whether the label is already affixed or to be affixed, no components shall be installed which visibly obscure the label in any way that fails to satisfy the visibility requirements described in the California Emission Control Label Specifications.

**CALIFORNIA FUEL VAPOR RECOVERY**

California regulations require that the vehicle fuel systems be designed to accommodate a vapor recovery fueling nozzle including unobstructed access to the fill pipe. Fuel filler pipes will comply with the "Specifications For Fill Pipes and Openings of Motor Vehicle Fuel Tanks" referenced in Title 13 California Administrative Code provided no part of the aftermarket body, as installed, intrudes within the access zone defined in CARB regulation 13 CCR 2235. The fuel pipe housing component is shown on the referenced figures and is attached to the aftermarket body via rivets. Fuel filler pipes installed, using alternative brackets, will comply with the above California vapor recovery regulations provided the aftermarket body does not interfere with the access zone as described by the California Air Resources Board, and the areas adjacent to this opening cannot damage the nozzle bellows nor the nozzle face plate during insertion, latching, disposing or removal.

**CALIFORNIA MOTOR VEHICLE EMISSION CONTROL LABEL**

To meet California emission certification regulations, the Vehicle Emission Control Information (VECI) and/or Important Engine Information (IEI) label must be welded, riveted, or otherwise permanently attached to an area within the engine compartment or to the engine in such away that it will be readily visible to the average person after installation of the engine in a vehicle. In selecting an acceptable location, the manufacturer shall consider the possibility of accidental damage (e.g., possibility of tools or sharp instruments coming in contact with the label). The label shall be affixed in such a manner that it cannot be removed without destroying or defacing the label, and shall not be affixed to any part which is likely to be replaced during the vehicle's useful life. For motor vehicles rated at 3856 kg (8500 lb) GVWR or less, the label shall not be affixed to any equipment which is easily detached from the vehicle. The label must include the heading "Vehicle Emission Control Information" for Medium-Duty trucks. As used in these specifications, readily visible to the average person shall mean that the label shall be readable from a distance of 460 cm [18 in] without any obstructions from vehicle or engine parts (including all manufacturer available optional equipment), except for flexible parts, (e.g.,vacuum hoses, ignition wires). Alternately, information required by these specifications to be printed on the label shall be no smaller than 8 point type size provided that no vehicle or engine parts,(including all manufacturer available optional equipment), except for flexible parts that can be moved out of the way without disconnection, obstruct the label.

Completed vehicles for retail sale in California require a machine-readable Vehicle Identification Number (VIN) bar-code label made of paper, plastic, metal, or other permanent material which shall be affixed in a readily visible location to either the door-latch post next to the driver's seating position, the door edge that meets this door-latch post, or above the instrument panel in a location clearly visible through the lower left corner of the windshield.

- All Incomplete Vehicles except stripped chassis type vehicles will conform to this standard.
- Stripped Chassis Type Vehicles:
  Conformity with CARB Motor Vehicle Emission Control Label specifications for VIN label is not substantially affected by the design of this incomplete vehicle. Accordingly, Ford Motor Company makes no representation as to conformity with this requirement. To assist a subsequent stage manufacturer with conforming to this specification, Ford Motor Company is providing a label which will accompany the *Incomplete Vehicle Manual* inside the protective plastic bag located in the dunnage box. For the VIN labels, sufficient clearance shall be provided to use a non-contact bar-code reading wand. Any adhesives used for labels shall be designed to withstand, for the vehicle's total expected life, typical vehicle environment conditions in the area where the label is attached. Typical vehicle environmental conditions shall include, but are not limited to, exposure to engine lubricants and coolants (e.g., gasoline, motor oil, brake fluids, water, ethylene glycol), underhood temperatures, steam cleaning, and paints or paint solvents.

  To meet U.S. Environmental Protection Agency important engine regulations, the Vehicle Emission Control Information and/or the Important Engine Information label must be affixed in a readily visible location. The labels must include the heading "Vehicle Emission Control Information" or "Important Engine Information". See sample labels on the following page.

  When the VECI/IEI label is supplied detached from the engine (with the operator's manual), it must be permanently mounted in a readily visible location to meet the preceding requirements. In addition, whether the label is already affixed or to be affixed, no components shall be installed which visibly obscure the label in any way such that the preceding requirements are not satisfied.

3) Some vehicles built by Ford Motor Company may exhibit higher engine compartment and exhaust system temperatures in some operating modes than in previous model years. Components, including exhaust heat shielding systems, have been installed on some vehicles in our assembly plants in an effort to provide greater protection against such temperatures. Subsequent manufacturers are responsible for providing thermal protection for any structure and/or equipment added to the vehicle and should **not** remove any components and/or exhaust heat shielding installed on the vehicles by Ford Motor Company.

4) The back pressure at the exhaust manifold must **not** be changed, and vehicle noise intensity (dbA) must **not** be allowed to increase. Catalytic converters must **not** be relocated. Refer to the latest SVE Bulletin Q-187 "2011 MY F-Series Super Duty 6.7L Exhaust System Modifications" or the latest revision for exhaust modification guidance.

5) If a subsequent manufacturer desires to modify or add to the evaporative emission control system, or add permanent gasoline fuel tank(s) or an evaporative emission control system to a vehicle required to have an evaporative emission control system, the subsequent manufacturer is responsible for installing an appropriate evaporative emission control system. U.S. Environmental Protection Agency (EPA) approval and California Air Resources Board (CARB) approval (for all vehicles which will be delivered for sale and primary use in California) must be obtained by the subsequent manufacturer for any evaporative emission control system installed or modified by the subsequent manufacturer.

6) Must **not** be altered such that CARB fuel vapor recovery regulations are not met.

7) May **not** be removed until after sale to ultimate customer. Also see Frontal Area and Curb Weight considerations (above).

8) Any rerouting or change in materials cannot be made unless approval is obtained from the California Air Resources Board (CARB) and/or the U.S. Environmental Protection Agency (EPA). Unleaded fuel filler pipe restrictions may not be removed.

9) To meet U.S. EPA Regulation, the Vehicle Emission Control Information label must be affixed in a readily visible location. See sample labels on the following page.

10) The check engine light is required by emissions regulations. It is installed by Ford Motor Company in all vehicles except the Stripped Chassis model. For this vehicle, it is located in the instrument cluster shipped in the dunnage box. The final stage manufacturer must install this light. For information regarding installation of Check Engine Warning Light to the Stripped Chassis model, see "Electrical Wiring - Adding Lights or Electrical Devices" section of this book.

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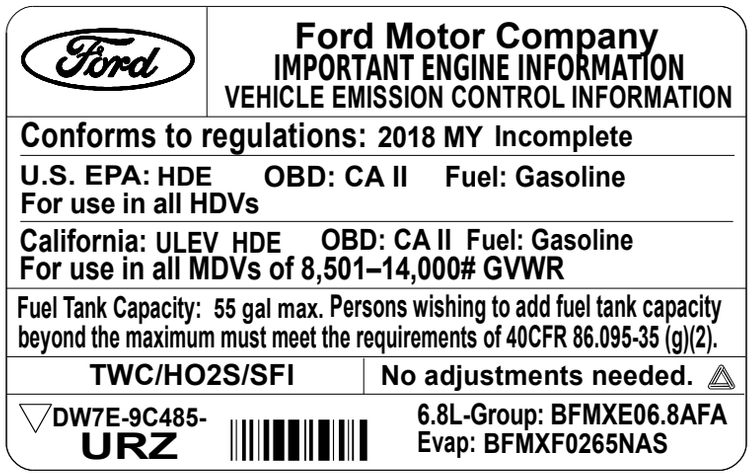
# SAFETY / EMISSIONS
# VEHICLE NOISE REGULATIONS &
# EMISSION CONTROL MODIFICATIONS (Cont'd)

**VECI LABEL (Typical)**


Ford Motor Company
IMPORTANT ENGINE INFORMATION
VEHICLE EMISSION CONTROL INFORMATION
Conforms to regulations: 2018 MY Incomplete
U.S. EPA: HDE OBD: CA II Fuel: Gasoline
For use in all HDVs
California: ULEV HDE OBD: CA II Fuel: Gasoline
For use in all MDVs of 8,501–14,000# GVWR
Fuel Tank Capacity: 55 gal max. Persons wishing to add fuel tank capacity beyond the maximum must meet the requirements of 40CFR 86.095-35 (g)(2).
TWC/HO2S/SFI
No adjustments needed.
DW7E-9C485-URZ
6.8L-Group: BFMXE06.8AFA
Evap: BFMXF0265NAS

**EVAPORATIVE EMISSIONS**

All Ford Motor Company Trucks are required to comply with evaporative emissions requirements established by the U.S. Environmental Protection Agency or the California Air Resources Board. Production fuel systems supplied on incomplete vehicles manufactured by Ford Motor Company comply with applicable requirements.

**WARNING:**

If the subsequent manufacturer adds to or modifies the fuel system in any manner, it becomes that manufacturer's responsibility to assure compliance with the applicable Federal or California emissions standards.

**MALFUNCTION INDICATOR LIGHT (MIL)**

The "Malfunction Indicator Light" (MIL) is used to indicate malfunctions of the engine's emission control system and certain powertrain emissions related components. For all incomplete vehicles, except Basic (Stripped) Chassis (which is not equipped with an instrument panel), the MIL is installed by Ford Motor Company and operational in the instrument panel.

Basic (Stripped) Chassis vehicles have the MIL warning light installed in the instrument cluster which is shipped in the dunnage box. If an alternate instrument cluster is utilized, the final stage manufacturer must install an operational MIL in the instrument cluster. The MIL must be located on the driver's side instrument panel and be of sufficient illumination and location to be readily visible under all lighting conditions and shall be amber in color when illuminated. The MIL, when illuminated, shall display the phrase "Check Engine" or "Service Engine Soon". The word "Powertrain" may be substituted for "Engine" in the previous phrases. Alternatively, the ISO engine symbol may be substituted for the word "Engine" or for the entire phrase. This is a requirement for emission certification.

# SAFETY / EMISSIONS
# EMISSION COMPLIANCE GUIDELINES
# NON-OEM FUEL TANK MODIFICATIONS



These guidelines are applicable to those tanks designed to replace the Original Equipment Manufacturer (OEM) fuel tank for the purpose of increasing fuel capacity or to accommodate modifications to the vehicle. These tanks differ in design from the OEM tanks in terms of size, tank material, shape, location or purge strategy. Auxiliary fuel tanks are those tanks added on to the existing OEM tank(s) in order to increase the vehicle's fuel capacity.

**WARNING:** Prohibitions Against Uncertified Vehicles, Devices and Tampering

Changes to the size, material, or shape of a fuel tank may cause the certified vehicle to exceed applicable evaporative emissions or not comply with OBD-II monitoring requirements. Such changes may constitute tampering. Changes made to accommodate the installation of non-OEM fuel tanks may also constitute tampering; these include changes in the Filler and Vent Tube Assembly and Hose, Fuel Vapor Purge Line, Vapor Control Orifice and/or Float Valve Assembly, Vapor Delivery Lines/Hoses/Clamps, etc.

Ford Motor Company vehicles are certified as compliant with California's OBD-II (On-Board Diagnostic II) requirements. These requirements (among other diagnostic tests) check the evaporative emission control and fuel tank system for leaks. A decrease or increase in tank size or change in material and shape, may degrade the function of the evaporative leak monitor. Further, decreases below the 25 gallon threshold would make the vehicle ineligible for an alternative to the 0.020" requirement. Degrading of the evaporative leak detection monitor may constitute tampering. Violation of the applicable Federal, State or Canadian Provincial Laws prohibiting tampering may result in civil or criminal liability.

## EXEMPTIONS FROM TAMPERING PROHIBITIONS FOR FUEL TANK MODIFICATIONS

Only those modifications to the evaporative emission control system (which includes the fuel tank) or OBD-II system that are specifically approved or certified by EPA and/or CARB may be exempted from these tampering prohibitions. In general, to obtain an exemption, the aftermarket manufacturer or converter must demonstrate that the replacement or auxiliary fuel tank does not reduce the effectiveness of the vehicle's OBD-II and evaporative emission control systems. This demonstration may require an evaluation using the Federal Test Procedure and enhanced evaporative system test procedures to ensure compatibility with OBD-II system requirements as well as compliance with the applicable evaporative emission standards.

Any conversion made to the vehicle must comply with the applicable Federal and California on-board diagnostic (OBD-II) system regulations. Any changes that potentially affect the OBD-II system must be reported to the Agencies (EPA and/or CARB) for their review and approval.

## GENERAL INFORMATION RELATING TO EPA/CARB APPROVAL OF AFTERMARKET CONVERSIONS

Any conversion made to the vehicle must comply with the applicable Federal and California Emission regulations and laws including EPA's Tampering Prohibition (See EPA Mobile Source Enforcement Memorandum 1A and Addendum thereto as revised at 63 FR 32878) or obtain an "Exemption for Aftermarket from Tampering Prohibition" under Subpart F, 40 CFR 85. For California, please refer to CARB Mail Out #96-27, subject: "Sales and Installation of Replacement (and Auxiliary) Fuel Tanks", dated September 9, 1996. (See the Section of this Layout Book entitled "Vehicle Noise Regulations / Emissions Control Modifications" for a further explanation of the potential liabilities for the modifier.)

## CARB WEBSITE

To apply for specific VC 27156 exemptions from the CARB for aftermarket conversions including non-OEM fuel tank replacement, refer to CARB consumer information on aftermarket performance and add-on parts at the following website: http://www.arb.ca.gov/msprog/aftermkt/aftermkt.htm

## EPA WEBSITE

EPA information concerning the conditions that must be satisfied to obtain an EPA exemption for an aftermarket conversion from the tampering prohibition contained in Section 203 of the Clean Air Act can be found at the Code of Federal Regulations and using the search option: http://www.gpoaccess.gov/cfr/index.html

## FORD MOTOR COMPANY BODY BUILDERS ADVISORY SERVICE

Changes to the fuel system can affect the Powertrain Control Module (PCM). The PCM will respond to changes which can result in activation of the check engine light and may result in loss of engine performance. Contact Ford Truck Body Builders Advisory Service for additional information at www.fleet.ford.com/truckbbas.

## FORD MOTOR COMPANY AND SEMA WEBSITE

Ford Motor Company and the Specialty Equipment Market Association (SEMA) have established a Powertrain Technology Initiative (PTI) for OBD-II related products. PTI provides manufacturers of performance aftermarket equipment with the opportunity to obtain custom-developed software calibrations needed for the proper use and installation of aftermarket products which could affect emissions, OBD-II compliance, emission compliance and durability, fuel requirements, exhaust temperatures, etc. If these categories are significantly affected, a calibration modification may be appropriate. For additional information about the PTI program, contact SEMA via their website http://www.sema.org/ .

## GENERAL OBD-II MONITORING REQUIREMENTS

The EPA has regulations in place establishing requirements for on-board diagnostic (OBD-II) systems on light duty vehicles and light duty trucks beginning with the 1994 model year. The purpose of the OBD-II system is to assure proper emission control system operation for the vehicle's lifetime by monitoring emission-related components and systems for deterioration and malfunction.

**NOTE:** California has slightly different OBD-II requirements from EPA's OBD-II requirements; however, systems designed to meet California's requirements are also accepted by EPA as meeting the federal requirements.

## WHAT IS OBD-II AND HOW DOES IT WORK?

Automobile manufacturers developed the first OBD-II systems in the early 1980's as electronic systems replaced mechanical systems. The engines in today's vehicle are largely electronically controlled. Sensors and actuators sense the operation of specific components (e.g., the oxygen sensor) and actuate others (e.g., the fuel injectors) to maintain optimal engine control. An on-board computer, known sometimes as a "powertrain control module" or an "engine control unit" controls all of these systems. With proper software, the on-board computer is capable of monitoring all of the sensors and actuators to determine whether they are working as intended. It can detect a malfunction or deterioration of the various sensors and actuators, usually well before the driver becomes aware of the problem through a loss in vehicle performance or drivability. The sensors and actuators, along with the diagnostic software in the on-board computer, make up what is called "the OBD-II system". OBD-II monitoring requirements include the following systems: catalyst, misfire, evaporative, secondary air, air conditioning system refrigerant, fuel, oxygen sensor, Exhaust Gas Recirculation (EGR), Positive Crankcase Ventilation (PCV), thermostat monitoring, and comprehensive component monitoring.

## SOURCES OF INFORMATION ON OBD-II REGULATIONS

For a comprehensive description of the regulations governing OBD-II systems, visit the EPA and CARB websites shown below:
(EPA) http://www.epa.gov/obd
(CARB) http://www.arb.ca.gov/msprog/obdprog/obdprog.htm

# SAFETY / EMISSIONS
# U.S. AND CANADA SAFETY STANDARDS



## STANDARDS AND REGULATIONS

The National Traffic and Motor Vehicle Safety Act of 1966 (United States) and the Motor Vehicle Safety Act (Canada) and the standards and regulations issued under authority of these laws impose responsibilities on dealers, intermediate and final stage manufacturers, and vehicle alterers and modifiers, as well as on Ford Motor Company. This section identifies some of these responsibilities. **It is not intended to be comprehensive, nor to provide advice on legal questions applicable to individual situations.** Advice on matters involving particular factual situations should be obtained from your legal counsel or from the National Highway Traffic Safety Administration (United States) or the Ministry of Transport (Canada).

Included among these safety standards and regulations are those applicable to trucks, buses, multipurpose passenger vehicles, passenger cars, vehicles manufactured in two or more stages, and to certain types of motor vehicle equipment offered for sale in the United States or Canada.

**Completed vehicles as manufactured by Ford Motor Company and Ford Motor Company of Canada, Limited, are certified as conforming to all applicable Motor Vehicle Safety Standards issued under the National Traffic and Motor Vehicle Safety Act of 1966 (U.S.) or the Motor Vehicle Safety Act (Canada).**

**Where the vehicle is incomplete, a dealer or bodybuilder who, after delivery and before retail sale, completes the vehicle is responsible for certification that the completed vehicle conforms to applicable U.S. or Canada Motor Vehicle Safety Standards.** Dealers and body builders may be subject to substantial penalties if they sell or offer for sale vehicles which do not conform to all applicable U.S. Or Canada Standards.

Certification-related information concerning Ford Motor Company completed vehicles and incomplete vehicles follows:

## COMPLETED VEHICLES

All completed vehicles manufactured by Ford Motor Company and Ford Motor Company of Canada, Limited, for use on the public roads are provided with safety compliance certification labels affixed to the vehicles at the assembly plants. These labels contain information required by Part 567 of Title 49 of the Code of Federal Regulations for completed vehicles offered for sale in the United States and by Section 6 of the Canadian Motor Vehicle Safety Regulations for completed vehicles offered for sale in Canada. This information includes, among other things, the Gross Axle Weight Rating (GAWR) for each axle of the vehicle and the Gross Vehicle Weight Rating (GVWR) of the total vehicle. The labels also list the tire and rim data required by FMVSS or CMVSS 120, Tire Selection And Rims For Motor Vehicles Other Than Passenger Cars.

Completed vehicles, manufactured by Ford Motor Company for sale in the United States, will have a label similar to the one shown on this page (the label is located on the driver's door latch pillar).

The Canadian Motor Vehicle Safety Act and Regulations require: (1) display of the National Safety mark (below); (2) the expression "Canada Motor Vehicle Safety Standards" or "CMVSS"; and (3) "Poids Nominal Brut du Vehicule" or "PNBV" on vehicles manufactured for sale in Canada. A label containing this information is shown on this page.

Completed vehicles manufactured by Ford Motor Company for sale in Canada, will have a label similar to the one shown on this page containing the Canadian National Safety Mark or a separate National Safety Mark label.

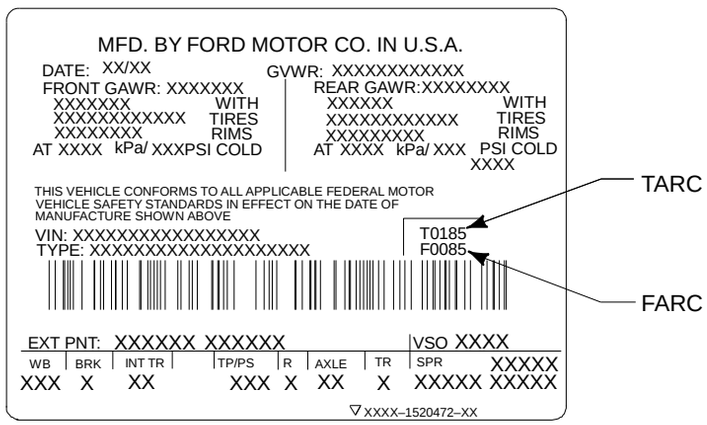
Alteration of completed vehicles before the first purchase of the vehicle for purposes other than resale may affect compliance of the vehicle to certain safety standards. Parts 567 and 568 of Title 49 of the Code of Federal Regulations state requirements for vehicle alterers in the United States. In Canada, Regulation 9 of the Canadian Motor Vehicle Safety Regulations determines the obligations of vehicle alterers under the Canadian Motor Vehicle Safety Regulations.

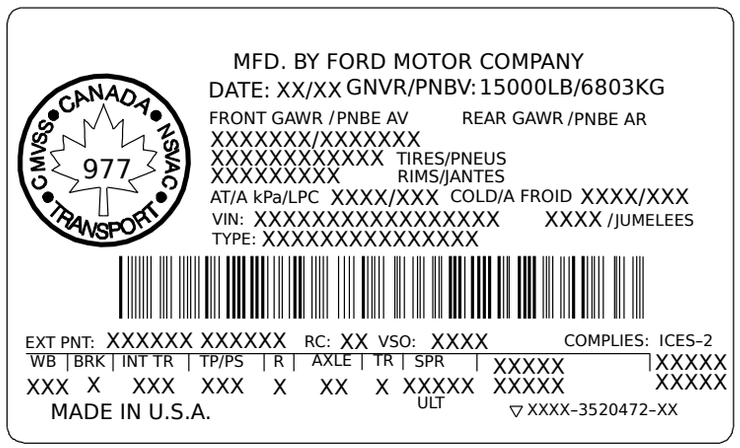
**NOTE:** For completed vehicles offered for sale in the province of Quebec, Canada, the label will be printed in French.

The following section headed "Information For Persons Who Alter Completed Vehicles" explains the "Accessory Reserve Capacity" information printed on the safety compliance certification label and its relationship to C/FMVSS 105 or 135 (Hydraulic Brakes), C/FMVSS 126 (Electronic Stability Control Systems), C/FMVSS 138 (Tire Pressure Monitoring Systems), C/FMVSS 204 (Steering Column Rearward Displacement), C/FMVSS 208 (Occupant Crash Protection), C/FMVSS 212 (Windshield Mounting), C/FMVSS 219 (Windshield Zone Intrusion), C/FMVSS 301 (Fuel System Integrity), and compliance testing for Ford Motor Company completed vehicles.

## VEHICLES 4536 KG (10,000 LBS) GVWR AND LESS

Trucks, buses and MPVs having GVWRs of 4536 kg (10,000 lb) and less manufactured by Ford Motor Company in the current model year are certified as complying with the requirements of all applicable Federal U.S. and Canadian Motor Vehicle Safety Standards including C/FMVSS 105 or 135, Hydraulic Brakes; C/FMVSS 126 Electronic Stability Control Systems; C/FMVSS 138, Tire Pressure Monitoring Systems; C/FMVSS 204, Steering Column Rearward Displacement (if the vehicles have unloaded vehicle weights of 2495 kg (5500 lb) or less); C/FMVSS 208, Occupant Crash Protection (injury criteria if vehicles GVWR is 3856 kg (8500 lb) or less having an unloaded vehicle weight of 2495 kg (5500 lb) or less); C/FMVSS 212, Windshield Mounting; C/FMVSS 214, Side Impact Protection; C/FMVSS 216a, Roof Crush Resistance; C/FMVSS 219, Windshield Zone Intrusion; C/FMVSS 226, Ejection Mitigation; and C/FMVSS 301, Fuel System Integrity. Ford Motor Company conducts compliance testing and makes compliance representations based on vehicle test weights that include the weights of all available regular production options plus the loads specified by C/FMVSS 105, 126, 135, 138, 204, 208, 212, 214, 216a, 219, 226, and 301. With the exception of C/FMVSS 105 or 135, the test weight for a particular vehicle is usually less than the GVWR indicated on the vehicle safety compliance certification label.





MFD. BY FORD MOTOR COMPANY
DATE: XX/XX GNVR/PNBV: 15000LB/6803KG
CANADA NSVAC TRANSPORT CMVSS 977
FRONT GAWR /PNBE AV
REAR GAWR /PNBE AR
XXXXXXX/XXXXXXX
XXXXXXXXXXX TIRES/PNEUS
XXXXXXXXX RIMS/JANTES
AT/A kPa/LPC XXXX/XXX COLD/A FROID XXXX/XXX
VIN: XXXXXXXXXXXXXXXXX XXXX /JUMELEES
TYPE: XXXXXXXXXXXXXXXX
EXT PNT: XXXXXX XXXXXX RC: XX VSO: XXXX COMPLIES: ICES-2
WB BRK INT TR TP/PS R AXLE TR SPR
XXX X XXX XXX X XX X XXXXX XXXXX XXXXX
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ULT
MADE IN U.S.A.
XXXX–3520472–XX

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# SAFETY / EMISSIONS
# U.S. AND CANADA SAFETY STANDARDS (Cont'd)



**IMPORTANT INFORMATION!**
**For Persons Who Alter Completed Vehicles**

**The following applies to the alteration of vehicles completed by Ford Motor Company.**

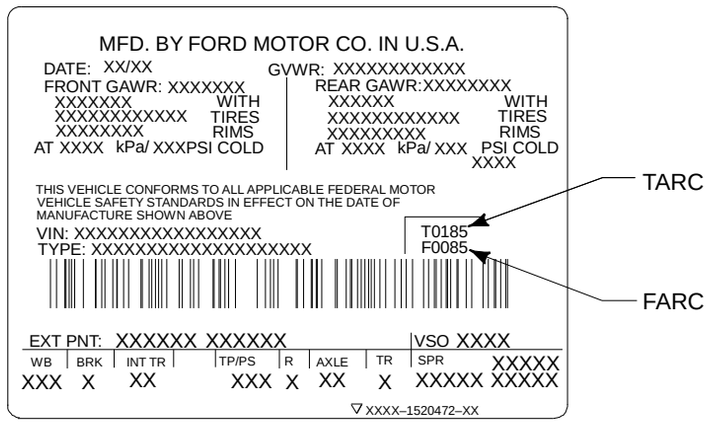
The degree of conformity to safety standards of incomplete vehicle chassis produced by Ford Motor Company is represented by the Incomplete Vehicle Manual (IVM). An IVM is included in dunnage accompanying each Incomplete Vehicle.

Vehicle alterers should exercise caution when adding weight to the vehicle by installing accessories or modifying the vehicle because if the unloaded vehicle weight of the altered vehicle exceeds the unloaded vehicle weight for which Ford Motor Company has established compliance, then the vehicle alterer will be responsible to certify the altered vehicle pursuant to Title 49 of the Code of Federal Regulations Sections 567.7 and 568.8 in the United States or to Section 9 of the Canadian Motor Vehicle Safety Regulations in Canada.

Payload worksheets are provided in the Ford Truck Source Book at your Ford Dealer to help prospective purchasers of Ford Motor Company truck products estimate the total weight of accessories, equipment, and modifications that may be added to the completed vehicle without exceeding the allowable weight ratings for the vehicle in question. Specific questions on this or related subjects may be directed to the Ford Truck Body Builder Advisory Service.

For each completed vehicle, Ford Motor Company determines the **TOTAL ACCESSORY RESERVE CAPACITY (TARC)**, which represents the amount of accessory or modification weight in pounds that can be added to a certified vehicle before its unloaded vehicle weight exceeds the unloaded vehicle weight for which Ford Motor Company has established compliance. Total Accessory Reserve Capacity designations assume the use of permanently attached components resulting in center of gravity locations generally similar to those of comparable completed vehicles. Any additions or alterations that significantly affect the center of gravity of the total unit could impose more severe conditions than those for which Ford Motor Company has established compliance to FMVSS and CMVSS requirements. Examples of such extremes would be the installation of relatively heavy devices at the front or rear of the vehicle, particularly if these devices also had very high centers of gravity.

Vehicles having a GVWR greater than 10,000 lb manufactured by Ford Motor Company display a Total Accessory Reserve Capacity weight that represents the maximum weight that can be permanently installed without compromising the durability and allow a reasonable minimum cargo for the customer. Total Accessory Reserve Capacity is provided on the Safety Compliance Certification Label (located on the driver's door latch pillar of Ford Motor Company completed vehicles, as shown in the following example.




Total Accessory Reserve Capacity specifies the total weight of permanently attached accessories or equipment that can be added to the vehicle. T0185 in the illustrated example indicates that 185 lbs of accessories or equipment can be added to the vehicle. Also specified is the **FRONT AXLE ACCESSORY RESERVE CAPACITY (FARC)** (F0085 in the illustrated example). Although not directly applicable to FMVSS/CMVSS 204, 208, 212, and 219 conformity representations, this magnitude represents the allowable weight that may be added in various forms (permanently attached equipment and accessories, removable equipment and accessories or any combination thereof) without overloading the front axle. Except for vehicles with the Snowplow Prep Package, this value will usually be less than the Total Accessory Reserve Capacity. Thus in the example, a total of 185lbs of permanently installed equipment may be added to the vehicle, but its distribution must be such that the load on the front axle is not increased by more than 85 lbs. However, although the Front Axle Accessory Reserve Capacity value may be greater than the Total Accessory Reserve Capacity value in some cases, the latter must never be exceeded. For vehicles with the Snowplow Prep Package, the Front Axle Accessory Reserve Capacity may be greater than the Total Accessory Reserve Capacity. This additional front axle capacity can be utilized to accommodate the removable snowplow components, such as the blade assembly.

Should the Front Axle Accessory Reserve Capacity on a Snowplow Package optioned vehicle be less than that which is required to accommodate the snow plow assembly, it should be understood that allowances for carrying persons in at least two designated seating positions (those provided with seat belts) have already been made. Therefore, it may be possible to operate the vehicle with minimum cargo and only one or two persons on board.

To prevent overloading under these circumstances, it is recommended that the vehicle alterer weigh the front axle under the conditions in which the vehicle is to be operated to ensure that the Front Gross Axle Weight Rating is not exceeded. See the Loading Information section of the *Owner Manual*.

If the weight and weight distribution (front to rear) of the accessories or equipment to be added are not known, it will be necessary to weigh the vehicle before and after accessories or equipment are added to verify that neither the Front Axle Accessory Reserve Capacity nor the Total Accessory Reserve Capacity has been exceeded. When weighing the vehicle, remember to have all fluids necessary for vehicle operation (including fuel) filled to maximum capacity and weigh vehicle by axle so that front axle weight and total vehicle weight can be determined. Subtract the front axle weight of the vehicle before modification from the front axle weight of the vehicle after accessories or equipment have been added; this value must be equal to or less than the Front Axle Accessory Reserve Capacity (for the above example — 85 lb). Subtract the total vehicle weight before modification from the total vehicle weight after accessories or equipment have been added; this value must be equal to or less than the Total Vehicle Accessory Reserve Capacity (for the above example — 185 lb). Use the actual Accessory Reserve Capacity information as it appears on the safety compliance certification label of your vehicle.

If you know the weight and weight distribution of the accessories or equipment (including all fluids, if applicable) to be added, compare these weights with the Total Accessory Reserve Capacity to ensure that the added accessories or equipment do not exceed the Total Accessory Reserve Capacity.

Compliance to FMVSS and CMVSS 105 or 135 depends upon, among other things, the location of the center of gravity of the completed vehicle. Therefore, any modification or alteration to a completed vehicle must take into account its effect upon FMVSS and CMVSS 105 or 135 conformance. A set of guidelines is contained at the end of the completed vehicle portion of this section. A section specifically addressing the modification of pickup trucks in ways that include replacing pickup boxes with other equipment is contained in the “Pickup Box Removal / Alterations” section of this book.

Completed vehicles as produced by Ford Motor Company meet the Center High Mounted Stop Lamp (CHMSL) requirements of FMVSS 108, Lamps, Reflector Devices, and Associated Equipment, and the mirror requirements of FMVSS and CMVSS 111, Rearview Mirrors. Removing a pickup box and installing a second unit body could affect compliance of the vehicle to these requirements even though the CHMSL and mirror systems have not been altered.

For an Incomplete Vehicle, please refer to its Incomplete Vehicle Manual (IVM).

**WARNING:**

The Total Accessory Reserve Capacity weight limitation found on the Safety Compliance Certification Label refers to FMVSS and CMVSS 204, 208, 212, and 219 compliance only. If the added weight is 227 kg [500 lb] or more and the vehicle’s GVWR rating is 3856 kg [8500 lb] or less, the modifier may be responsible for recertification to the applicable EPA, CARB, or CMVSS emissions standards (refer to MSAPC [EPA] Advisory Circular No. 64).

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# SAFETY / EMISSIONS
# U.S. AND CANADA SAFETY STANDARDS (Cont'd)



**GUIDELINES FOR REVISING GAWR CAPACITIES FOR FORD MOTOR COMPANY LIGHT TRUCK VEHICLES**

**NOTE: GVWR increases may not be made on Ford Motor Company Light Truck vehicles.**

These guidelines are provided in response to requests for information on revising the Gross Axle Weight Rating (GAWR) capacities of Ford Motor Company Light Truck vehicles. Dealers or purchasers should first try to obtain a vehicle with the desired GAWR capacities before modifying a vehicle to revise its weight ratings. If circumstances require a vehicle to be altered and the GAWR ratings to be revised, the following guidelines must be followed:

1. This information is provided for new, current model vehicles, to assist vehicle alterers who modify vehicles as described below in determining whether the modified vehicle complies with applicable regulatory requirements.

2. Revised GAWR capacities must be within the currently available capacities in Ford Motor Company production for the particular model to maintain the vehicle's warranty. **The GVWR may be revised downward, but must remain in the same GVWR range as coded in the fourth position of the Vehicle Identification Number (VIN) in accordance with the requirements of 49 CFR Part 565 and CMVSS 115.** The VIN is displayed on the driver's side of the instrument panel and is visible from outside the vehicle. For GVWR codes utilized in the fourth position of the VIN, see the list in the chart on this page.

**EXAMPLE:**

A typical F-Series VIN is 1FTSF3BS8JEA01784. The fourth position in the VIN is S. Therefore, the GVWR of the vehicle is in the range 9001 to 10,000 lb and the lowered GVWR of this vehicle must fall in this GVWR range as well.

3. The appropriate chassis component or components (axles, brakes, tires, tire pressure, wheels, springs) are to be modified or changed to provide the revised GAWR capacity desired. All new suspension components installed are to have the same engineering specifications as those used by Ford Motor Company in production (Ford Motor Company service parts meet those specifications) at the GAWR capacities desired and must be installed according to the procedures specified in the applicable model year *Ford Truck Service Manual* to maintain the vehicle's warranty. Refer to the *Ford Source Book* for component specifications information. The person who alters the vehicle should maintain records of the modifications made to obtain the desired revised GAWR capacities in order to document the basis for certification to applicable Federal Motor Vehicle Safety Standards. Besides the suspension components noted above, the specifications for other components that have been altered must also be carefully reviewed to establish that these systems are equivalent to those provided by Ford Motor Company in a production vehicle at the GAWR capacities desired. These systems include brakes, steering, frame, powertrain (engine availability, driveline, transmission, rear axle ratio), and axle capacities (both front and rear) and are also specified in the *Ford Source Book*. For other information concerning the component changes necessary for the desired GAWR capacities, please contact the Ford Truck Body Builder Advisory Service.

## Restraint, Brake System and GVWR Class (VIN Position 4)

| VIN POSITION 4 Restraint, Brake System and GVWR Class | | | | Restraint Category | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Vehicle Type** | **Brake System** | **GVWR Class*** | **GVWR Range** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** |
| Passenger Car | - | - | - | K | | F | B | H | | 6 | D | U | 5 | | T | | |
| | | | | | | | | | | | | | | | | | |
| MPV, Truck | Hydraulic | Class A: | Less than 3,000 lbs. | | | | | | | | | | | | | | |
| MPV, Truck | Hydraulic | Class B: | 3,001-4,000 lbs. | | | | | | | | | | | | | | |
| MPV, Truck | Hydraulic | Class C: | 4,001-5,000 lbs. | | | Y | K | A | | | C | | | 7 | | | |
| MPV, Truck | Hydraulic | Class D: | 5,001-6,000 lbs. | | | Z | L | D | G | P | T | U | | 8 | | | |
| MPV, Truck | Hydraulic | Class E: | 6,001-7,000 lbs. | | R | 6 | M | E | H | | | | 5 | | | | |
| MPV, Truck | Hydraulic | Class F: | 7,001-8,000 lbs. | B | V | R | N | F | J | | | | | | | | |
| MPV, Truck | Hydraulic | Class G: | 8,001-9,000 lbs. | | | | P | V | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| Truck, Bus | Hydraulic | Class G: | 8,501-9,000 lbs. | H | C | N | Y | | Z | | | | | | | K | 1 |
| Truck, Bus | Hydraulic | Class H: | 9,001-10,000 lbs. | J | D | S | B | 7 | A | | | | | | | L | 2 |
| Truck, Bus | Hydraulic | Class 3: | 10,001-14,000 lbs. | K | E | W | R | 8 | V | | | | | | | M | 3 |
| Truck, Bus | Hydraulic | Class 4: | 14,001-16,000 lbs. | L | F | X | T | 9 | | | | | | | | | 4 |
| Truck, Bus | Hydraulic | Class 5: | 16,001-19,500 lbs. | M | G | A | U | 0 | | | | | | | | | 5 |
| Truck, Bus | Hydraulic | Class 6: | 19,501-26,000 lbs. | N | | | | | | | | | | | | | 6 |
| Truck, Bus | Hydraulic | Class 7: | 26,001-33,000 lbs. | P | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| Truck, Bus | Air | Class 6: | 19,501-26,000 lbs. | W | | | | | | | | | | | | | |
| Truck, Bus | Air | Class 7: | 26,001-33,000 lbs. | X | | | | | | | | | | | | | |
| Truck, Bus | Air | Class 8: | 33,001-55,000 lbs. | Y | | | | | | | | | | | | | |

* Brake System (only) for buses and incomplete vehicles - GVWR class as shown are not applicable

| Restraint Category | |
|---|---|
| **Code** | **Restraint Devices and Location** |
| 1 | Manual belts WITHOUT air bags |
| 2 | Manual belts with driver frontal air bag ONLY |
| 3 | Manual belts with driver and passenger frontal air bags |
| 4 | Manual belts with driver and passenger frontal air bags and side inflatable restraint (1st row) |
| 5 | Manual belts with driver and passenger frontal air bags and side inflatable restraint (1st & 2nd row) |
| 6 | Manual belts with driver and passenger frontal air bags and side inflatable restraint (1st, 2nd, 3rd rows & add'l rows) |
| 7 | Manual belts with driver and passenger frontal air bags and side inflatable restraint (1st & 2nd row) and driver/passenger knee air bag |
| 8 | Manual belts with driver and passenger frontal air bags and side inflatable restraint (1st & 2nd row) and driver knee air bag |
| 9 | Manual belts with driver and passenger frontal air bags and side inflatable restraint (1st, 2nd, & 3rd row) and driver knee air bag |
| 10 | Manual belts with driver and passenger frontal air bags and side inflatable restraint (1st, 2nd, & 3rd row) and passenger knee air bag |
| 11 | Manual belts with driver only frontal air bags and side inflatable restraint (1st row) |
| 12 | Manual belts with driver and passenger frontal air bags and driver/passenger knee restraint |
| 13 | Manual belts with driver only frontal air bags and driver/passenger side inflatable restraint (1st row) |
| 14 | No restraints |

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# SAFETY / EMISSIONS
# U.S. AND CANADA SAFETY STANDARDS (Cont'd)



4. CERTIFICATION LABELS FOR ALTERED VEHICLES

**– UNITED STATES**

A person or company who alters a previously certified vehicle before the first purchase by the final customer in such a manner that its stated weight ratings are revised, is required by Federal Regulation (49 CFR Part 567.7) to affix an Altered Vehicle Certification Label in addition to the Ford Motor Company Completed Vehicle Certification Label.

The label must be affixed to the vehicle in the manner and form described in 49 CFR Part 567.4:

- The label shall, unless riveted, be permanently affixed in such a manner that it cannot be removed without destroying or defacing it.
- The label shall be affixed to either the hinge pillar, door-latch post, or the door edge that meets the door-latch post next to the driver's seating position, or if none of these locations is practicable, to the left side of the instrument panel (other permissible locations are also specified in 49 CFR Part 567.4).
- The lettering on the label shall be of a color that contrasts with the background of the label.
- The label shall contain the required statements in the English language and lettered in block capitals and numerals not less than three thirty-seconds of an inch high.
- The lettering shall be permanent. If typed or written, a protective clear cover may be necessary to prevent information from being wiped off.
- Label must not cover or obscure the chassis manufacturers label.

**– Canada**

"Alterers" of motor vehicles are required to affix a permanent label on vehicles that they manufacture bearing a statement of compliance as provided by Section 9 of the Canadian Motor Vehicle Safety Regulations. The vehicle alterer should affix a corporate label containing information shown on this page:

1. Insert the name of the company that altered the vehicle.
2. Insert the month and year during which the alteration of the vehicle was completed.
3. Insert a drawing of the National Safety Mark which includes their unique manufacturer number.
4. Insert revised GVWR or PNBV capacities in kilograms of the vehicle as altered, where they differ from those shown on the original compliance label.
5. Insert the GAWR/PNBEs of the vehicle as altered, where they differ from those shown on the original compliance label. Also, include the tire size, rim size and tire inflation pressure.
6. Insert the vehicle type stated on the safety standard certification label provided by Ford Motor Company. The type of vehicle, in both official languages, or the word "TYPE" along with one of the following abbreviations, namely:
   (i) "AT/PA" to refer to an auto transporter,
   (ii) "ATV/VTT" to refer to an all-terrain vehicle,
   (iii) "B/A" to refer to a bus,
   (iv) "BT/RA" to refer to a bus trailer,
   (v) "CD/CCC" to refer to a C-dolly,
   (vi) "CMC/MCC" to refer to a competition motorcycle,
   (ix) "LDD/CRC" to refer to a load divider dolly,
   (x) "MH/AC" to refer to a motor home,
   (xi) "MC" to refer to a motorcycle,
   (xii) "MPV/VTUM" to refer to a multipurpose passenger vehicle,
   (xiv) "RUM/MUR" to refer to a restricted-use motorcycle,
   (xv) "SB/AS" to refer to a school bus,
   (xvi) "TRA/REM" to refer to a trailer,
   (xvii) "TCD/CDC" to refer to a trailer converter dolly,
   (xviii) "TRU/CAM" to refer to a truck, and
   (xix) "TT/CT" to refer to a truck tractor.

The label must meet the following requirements as described in Section 9:

- Shall be permanently attached.
- Shall be affixed adjacent to the original compliance label required by Section 6.
- The lettering of the label shall be clear, indelible, indented, or embossed, or of a color that contrasts with the background color of the label, and in block capitals and numerals not less than 2 mm high.
- The label shall be permanently affixed to the same surface as that to which the National Safety Mark is affixed.

THIS VEHICLE WAS ALTERED BY (1)
IN (2) AND AS ALTERED, IT CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT IN (3)
TYPE (4)
GVWR: (5) LB
FRONT GAWR: (5) LB WITH (6)
TIRES, (6) RIMS AT (6) PSI COLD (6)
REAR GAWR: (5) LB WITH (6)
TIRES, (6) RIMS AT (6) PSI COLD (6)

(1) Insert individual or corporate name of vehicle alterer.
(2) Insert month and year in which alterations were completed.
(3) Insert appropriate month and year — no earlier than the manufacturing date of the original vehicle and no later than the date alterations were completed.
(4) Insert "Type" of altered vehicle, i.e., Truck, Bus, MPV, etc.
(5) Insert revised GAWR capacities in lb.
(6) Insert appropriate tire, rim and cold inflation pressure information corresponding to the revised GAWR capacities (insert the word "DUAL" after the rear wheel cold inflation pressure information on dual wheel vehicles).

**TYPICAL CERTIFICATION LABEL FOR ALTERED VEHICLE FOR SALE IN THE UNITED STATES**

THIS VEHICLE WAS ALTERED BY/CE VÉHICLE A ÉTÉ MODIFIÉ PAR
(1)
DATE: (2) (3)
GVWR: (4) KG
FRONT GAWR: (5) KG WITH (5)
TIRES, (5) RIMS AT (5) kPa COLD
REAR GAWR: (5) KG WITH (5)
TIRES, (5) RIMS AT (5) kPa COLD
TYPE: (6)

**TYPICAL CORPORATE LABEL INFORMATION FOR ALTERED VEHICLES FOR SALE IN CANADA (REFERENCE SECTION 9 OF THE CANADIAN MOTOR VEHICLE SAFETY REGULATIONS)**

(Cont'd next page)

## FMVSS AND CMVSS 105 / 135 HYDRAULIC BRAKE SYSTEM COMPLIANCE GUIDELINES FOR ALTERED F-150, TRANSIT CONNECT AND E-SERIES VEHICLES (EXCEPT WHEN COMPLETED AS A SCHOOL BUS)

### FMVSS/CMVSS 105 and 135 INFORMATION

Vehicle weight and dimensional information required for center of gravity calculations are available in the *Ford Source Book*. See your local Ford Dealer and refer to appropriate model year and specific vehicle for required information.

Abbreviated definitions and a vehicle diagram to assist with the equations for the FMVSS 105 and 135 segment are shown on the next page for F-150, Transit Connect, and E-Series vehicles (Super Duty F-Series is on a later page).

**NOTE:**
For Transit FMVSS 105 information, see the Statements of Conformity in the Transit *Incomplete Vehicle Manual* at www.fleet.ford.com/truckbbas under the "Publications" tab.

The vehicle, as altered will conform to FMVSS and CMVSS 105 or 135, Hydraulic Brake System, if:

- No alterations, modifications or replacements are made to the service or parking brake system, anti-lock brake system, vacuum system, wheels or tires, brake system, indicator lamp and wiring, brake system reservoir labeling, suspension ride height or spring rate, hydro-boost system, power steering pump and lines if used with hydro-boost, and engine belt drive system.
- Any removal of a Ford Motor Company body or chassis component is accompanied by the addition of equal weight.
- The vertical distance from the ground to the completed vehicle center of gravity should not exceed 36 inches for vehicles < 8000 lb GVWR and 48 inches for vehicles ≥ 8000 lb GVWR. (Restrictions for other standards may also apply).
- The applicable GAWR's, GVWR, and accessory reserve capacity (ARC) weights (see preceding pages) are not exceeded.
- The applicable center of gravity limitations are met using one of the following calculation methods on this page.

### FOR VEHICLES UNDER 3629 KG [8000 LB] GVWR

- The rear weight component (Wrul), as measured between the rear tires and the ground, does not exceed 58% of the completed vehicle weight at Unloaded Vehicle Weight plus 397 lb or 400 lb located in the driver and front passenger area (Wul).

  Maximum Wrul = .58 x Wul (see definitions on the next page).

  Lmin† does not apply to a SUB (Second Unit Body) of 120 lb or less when installed rearward of the front seats and forward of the centerline of the rear axle. (Do not restrict seat travel. See IVM for SgRP location and torso angle).

  † Lmin = The minimum horizontal center of gravity of the SUB measured in inches rearward from the centerline of the front axle.
- The horizontal center of gravity for the SUB is:
  - At or forward of the rear axle centerline:

    The vertical center of gravity for the completed vehicle at Unloaded Vehicle Weight + 397 lb or 400 lb passenger load CGv (Equation A) must not exceed 36.0 inches, when measured from the ground.
  - Behind the rear axle centerline:

    The vertical center of gravity of the completed vehicle at Unloaded Vehicle Weight + 400 lb passenger load must fall within the appropriate range determined from Table 6. The value of CGh (Equation B), which approximates the horizontal center of gravity of the completed vehicle, is used in Table 6 to determine the vertical center of gravity limits for the completed vehicle. The value CGv (Equation A), which approximates the vertical center of gravity of the completed vehicle, must fall within the appropriate range determined from Table 6.

**EQUATION A**

$$CG_v = \frac{CG_{vb} W_b + CG_{vc} W_c + 25P}{W_t}$$

**EQUATION B**

$$CG_h = \frac{\left(W_{rb} + W_{rc} + \frac{(P \times CG_{hp})}{WB}\right) \times WB}{W_t}$$

### FOR VEHICLES 3629 KG [8000 LB] THROUGH 8618 KG [19,000 LB] GVWR

The horizontal center of gravity for the SUB is:

- At or forward of the rear axle centerline:

  The vertical center of gravity for the completed vehicle at GVWR (CGv — Equation C) must not exceed 48 inches, when measured from the ground.
- Behind the rear axle centerline:

  The vertical center of gravity for the completed vehicle at GVWR must fall within the appropriate range determined from Table 6. The value of CGh (Equation D), which approximates the horizontal center of gravity of the completed vehicle, is used in Table 6 to determine the vertical center of gravity limits for the completed vehicle.

**EQUATION C**

$$CG_v = \frac{CG_{vb} W_b + CG_{vc}\left(W_c + W_l\right) + 25P}{GVWR}$$

**EQUATION D**

$$CG_h = \frac{\left(W_{rb} + W_{rc} + \left(\frac{P \times CG_{hp}}{WB}\right) + W_{rl}\right) \times WB}{GVWR}$$

| LIGHT TRUCK PASSENGER LOAD | |
|---|---|
| **GVWR [lb]** | **P [lb]** |
| 0 – 7716 | 397 |
| 7717 – 10,000 | 400 |
| 10,001 – 19,000 | 500 |

(Cont'd next page)

# SAFETY / EMISSIONS
# U.S. AND CANADA SAFETY STANDARDS (Cont'd)



**FMVSS AND CMVSS 105 / 135 HYDRAULIC BRAKE AND 126 ELECTRONIC STABILITY CONTROL SYSTEMS COMPLIANCE GUIDELINES FOR ALTERED FORD MOTOR COMPANY LIGHT TRUCKS. FOR INCOMPLETE VEHICLES – REFER TO THE *INCOMPLETE VEHICLE MANUAL* (IVM)**

L* = Horizontal distance between the SUB center of gravity and the ℄ of the front axle [inches].

P = Passenger load [pounds].

CGv = Vertical distance from the ground to the center of gravity of the completed vehicle [inches].

CGh = Horizontal distance from ℄ of the front wheels to completed vehicle center of gravity [inches].

CGvb = Vertical distance from the ground to the center of gravity of the SUB and/or permanently attached equipment [inches].

CGvc = Vertical distance from the ground to the center of gravity of the chassis (including cab if original equipment) [inches].

CGhp = Horizontal distance from the ℄ of the front wheels to the P (passenger load) [inches].

Wb = Weight of the SUB and/or permanently attached added equipment [pounds].

Wrb = Weight on the rear wheels of the SUB and/or permanently attached added equipment [pounds].

Wrc = Weight at the rear wheels of the vehicle (chassis and cab) (fuel tanks full), including option weight [pounds].

Wc = Weight of the vehicle (chassis and cab) (fuel tanks full), including option weight [pounds].

WB = Vehicle wheelbase [inches].

Wt = Total unladen weight = (Wb + Wc + P) [pounds]

GVWR= Gross Vehicle Weight Rating of the vehicle [pounds].

Wl** = Remaining cargo capacity [pounds].
Where: Wl = GVWR – (Wb + Wc + P)

Wrl** = Weight of the remaining cargo capacity on the rear wheels [pounds].

$$Wrl = \frac{(CGhl)\ Wl}{WB}$$

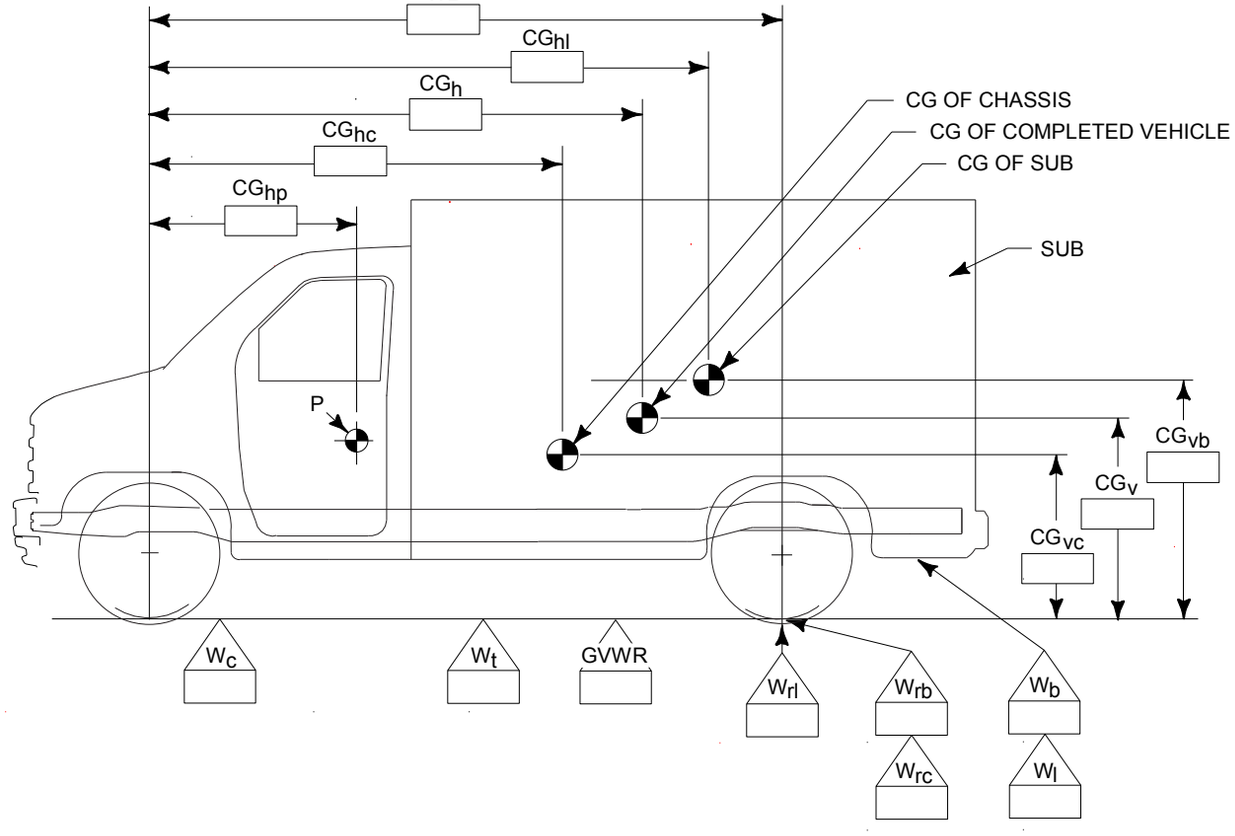
CGhc** = Horizontal distance from the ℄ of the front wheels to the center of gravity of the chassis [inches].

CGhl** = Horizontal distance from the ℄ of the front wheels to the cargo center of gravity [inches]. For many common vehicles, if the CGhl is not given in the table, then it may be estimated as the distance from the ℄ of the front wheel to the horizontal midpoint of the cargo area.

SUB = A Second Unit Body consists of the body structure and/or all the cargo carrying, work performing and/or load bearing components and/or equipment installed by a subsequent stage manufacturer on an incomplete vehicle, such that the incomplete vehicle becomes a completed vehicle.

* Required for < 8000 lb GVWR calculations only.

** Required for ≥ 8000 lb GVWR calculations only.

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**FMVSS AND CMVSS 105 / 135 HYDRAULIC BRAKE AND 126 ELECTRONIC STABILITY CONTROL SYSTEMS COMPLIANCE GUIDELINES FOR ALTERED FORD MOTOR COMPANY LIGHT TRUCKS. FOR INCOMPLETE VEHICLES – REFER TO THE *INCOMPLETE VEHICLE MANUAL* (IVM). (Cont'd)**

**SECOND UNIT BODY CENTER OF GRAVITY CALCULATION SUGGESTIONS**

In the case where the rear weight of the SUB and/or added equipment must be reduced and the CGv is found to be below the allowed minimum CGv, it may be possible to bring the vehicles into compliance by moving the CGh forward. Forward movement of the CGh can be accomplished by:

- Redistributing the weight of the SUB and/or added equipment.
- Adding permanently attached ballast forward of the CGh. In order to reduce the rear weight, the ballast must be forward of the front axle. (Caution must be taken not to exceed the GVWR or front GAWR of the vehicle.)

The following general equations can be used to find the center of gravity of the SUB and added equipment when there are several elements making up the CG:

**NOTE:** Removal of the components or body parts would be represented by a negative weight being used in these calculations.

$$CG_{vb} = \frac{CG_{vb1}(W_{b1}) + CG_{vb2}(W_{b2}) + \ldots + CG_{vbn}(W_{bn})}{W_{b1} + W_{b2} + \ldots + W_{bn}}$$

and the horizontal CG location of the combined SUB and added equipment is:

$$CG_{hb} = \frac{(W_{rb1} + W_{rb2} + \ldots + W_{rbn})\,WB}{W_{b1} + W_{b2} + \ldots + W_{bn}}$$

The front/rear weight break down can be found with the use of the following equation:

$$W_{rb} = \frac{CG_{hb}(W_{b1} + W_{b2} + \ldots + W_{bn})}{WB}$$

Conversely, the front weight component of the SUB and added equipment is:

$$W_{fb} = (W_{b1} + W_{b2} + \ldots + W_{bn}) - W_{rb}$$

**SAMPLE CALCULATIONS**

**Sample (1)**

**Vehicles < 8000 lb GVWR**

**(4x2) pickup box removal vehicle with 118 inch WB, 4800 lb GVWR**

**Known:**

$W_b$ = 250 lb
$W_{rb}$ = 260 lb (behind rear axle)
$W_c$ = 2912 lb
$W_{rc}$ = 1080 lb
$CG_{vb}$ = 28
$CG_{vc}$ = 25.5
$CG_{hp}$ = 53.9

This vehicle falls in the under 7717 lb GVWR category and the SUB CG is behind the rear axle.

**From equation A & B:**

$$CG_v = \frac{(28)(250) + (25.5)(2912) + (25)(397)}{3562} = \textbf{25.4 inches}$$

$$CG_h = \frac{260 + 1080 + \frac{397 \times 53.9}{113.9}}{3562} \times 113.9 = \textbf{48.9 inches}$$

**FMVSS AND CMVSS 105 HYDRAULIC BRAKE AND 121 AIR BRAKE SYSTEMS FOR F-650 / F-750:**

For F-650 and F-750 FMVSS / CMVSS 105 and 121 information, see Statements of Conformity in the Medium Truck *Incomplete Vehicle Manual* at www.fleet.ford.com/truckbbas under the "Publications" tab.

(Cont'd next page)

# SAFETY / EMISSIONS
# U.S. AND CANADA SAFETY STANDARDS (Cont'd)

**TABLE 1**
**TRANSIT CHASSIS CENTER OF GRAVITY**
**(Sample Weights with Full Fluids)**

| Model | GVWR (pounds) | Curb Weight (pounds) | Engine | $CG_{hc}$ | $CG_{vc}$ |
|---|---|---|---|---|---|
| Transit 250 SRW Low-Roof Van 3300 mm [130 in] WB | 9000 | 4981 | 3.7L Gasoline | 1443 [56.8] | 783 [30.8] |
| Transit 250 SRW Medium-Roof Van 3750 mm [148 in] WB | 9000 | 5747 | 3.2L Diesel | 1579 [62.2] | 834 [32.8] |
| Transit 350 DRW Hi-Roof Extended Van 3750 mm [148 in] WB | 10,360 | 6231 | 3.2L Diesel | 1849 [72.8] | 881 [34.7] |
| Transit 350 DRW Hi-Roof Extended Van 3750 mm [148 in] WB | 10,360 | 5960 | 3.7L Gasoline | 1883 [74.2] | 883 [34.8] |
| Transit 350 DRW 15-Passenger Wagon 3750 mm [148 in] WB | 9000 | 6560 | 3.5L GTDI | 1881 [74.0] | 877 [34.5] |
| Transit 250 SRW Chassis Cab 3504 mm [138 in] WB | 9000 | 4237 | 3.7L Gasoline | 1098 [43.2] | 730 [28.7] |
| Transit 250 SRW Chassis Cab 3504 mm [138 in] WB | 9000 | 4142 | 3.7L Gasoline | 1054 [41.5] | 723 [28.5] |
| Transit 350 SRW Chassis Cab 3954 mm [156 in] WB | 9500 | 4552 | 3.2L Diesel | 1113 [43.8] | 749 [29.5] |
| Transit 350 DRW Cutaway Cab 4522 mm [178 in] WB | 10,360 | -- | 3.2L Diesel | - [-] | 749 [29.5] |
| Transit 350 DRW Chassis Cab 4522 mm [178 in] WB | 10,360 | 4926 | 3.7L Gasoline | 1407 [55.4] | 693 [27.3] |

**TABLE 2**
**TRANSIT MINIMUM SECOND UNIT BODY WEIGHT FOR FMVSS 105 COMPLIANCE**
**(Calculated @ Rear Axle)**

| Model | Kilograms [pounds] |
|---|---|
| Transit Chassis Cab or Cutaway 3505 mm [138 in] WB | 159 [350] |
| Transit Chassis Cab or Cutaway 3962 mm [156 in] WB | 113 [250] |
| Transit Chassis Cab or Cutaway 4521 mm [178 in] WB | 0 [0] |

**TABLE 3**
**$CG_{hl}$ =** Horizontal distance from front axle to cargo CG

| Model | WB (in) | $CG_{hl}$ (in) † |
|---|---|---|
| **Super Duty F-Series:** | | |
| Regular Cab | 141.6 | 137 |
| Regular Cab | 145.3 | 139 |
| Regular Cab | 169.3 | 151 |
| Regular Cab | 193.3 | 163 |
| Regular Cab | 205.3 | 169 |
| SuperCab | 164.2 | 159 |
| SuperCab | 167.9 | 161 |
| SuperCab | 191.9 | 173 |
| Crew Cab | 176.0 | 169 |
| Crew Cab | 179.8 | 171 |
| Crew Cab | 203.8 | 186 |

† If $CG_{hl}$ is not given in the table or if the location of the cargo is not in the normal cargo area, then the $CG_{hl}$ may be estimated as the distance from the ℄ of the front wheel to the horizontal midpoint of the cargo area.

**TABLE 4**
**$CG_{hp}$** = Horizontal distance from front wheel ℄ to Passenger Load
[Dimensions are in inches]

| | |
|---|---|
| E-Series Cutaway † | = 48.5 |
| All Super Duty F-Series | = 61.9 |
| All Transit Models | = 40.6 |

† On E-Series Stripped Chassis the distance from the ℄ of the front axle to the H-point of the driver must be measured.

**TABLE 5**
**$CG_{vc}$**= Vertical distance from ground to chassis CG
[Dimensions are in inches]

| | |
|---|---|
| E-350 Cutaway | = 28.0 |
| E-450 Cutaway | = 26.5 |
| E-350/450 Stripped Chassis | = 26.5 |
| F-150 (4x2) | = 26.0 |
| F-150 (4x4) | = 28.5 |
| F-250/350 (4x2) SRW > 8500 lb GVWR | = 30.4 |
| F-250/350 (4x4) SRW > 8500 lb GVWR | = 31.4 |
| F-350 (4x2) DRW | = 30.4 |
| F-350 (4x4) DRW | = 31.4 |
| F-450/550 (4x2 & 4x4) DRW | = 35.0 |

**NOTE** — [ ] DIMENSIONS ARE INCHES.

(Cont'd next page)

# SAFETY / EMISSIONS
# U.S. AND CANADA SAFETY STANDARDS (Cont'd)



**TABLE 6**

**$CG_V$** = Vertical distance from ground to completed vehicle CG
[Dimensions are in inches]

**GVWR < 8000 lb – use Equations A & B**

| Model | WB | Equation for $CG_V$ Range | | |
|---|---|---|---|---|
| | | Upper Limit | | Lower Limit |
| N/A | | | | |

**GVWR ≥ 8000 lb – use Equations C & D**

Place the **$CG_h$** of the vehicle (from Equation D) into the appropriate equations below to determine the allowable range of the **$CG_V$** . If the actual **$CG_V$** (from Equation C) is within the range calculated, the center of gravity location is acceptable.

| Model | WB | Equation for $CG_V$ Range | | |
|---|---|---|---|---|
| | | Upper Limit | | Lower Limit |
| E-350 (SRW) | 138<br>158 | $CG_V$ =<br>$CG_V$ = | $1.27 \times CG_h - 60.0$<br>$1.27 \times CG_h - 69.5$ | $1.27 \times CG_h - 80.0$<br>$1.27 \times CG_h - 90.7$ |

**TABLE 7**
**SUPER DUTY F-SERIES VEHICLES MINIMUM SECOND UNIT BODY WEIGHTS (FMVSS 105 BRAKE COMPLIANCE)**
**Wide Frame Pickup Box Deletes**
**F-250/350 Maximum Frame Width 1018 mm [40.1 in]**

| Model and Configuration | Body Style | Wheelbase mm [in] | Minimum SUB Weight kg [lb] |
|---|---|---|---|
| F-250/350 SRW | Regular Cab | 3596 [141.6] | 172 [380] |
| | SuperCab | 4170 [164.2] | |
| | Crew Cab | 4470 [176.0] | |
| | SuperCab | 3759 [148.0] | 154 [340] |
| | Crew Cab | 4059 [159.8] | |
| F-350 DRW | Regular Cab | 3596 [141.6] | 190 [420] |
| | SuperCab | 4170 [164.2] | |
| | Crew Cab | 4470 [176.0] | |
| | SuperCab | 3759 [148.0] | 172 [380] |
| | Crew Cab | 4059 [159.8] | |

(Cont'd next page)

**TABLE 8**

**TRANSIT MAXIMUM UNLOADED VEHICLE WEIGHT (UVW) FOR INCOMPLETE VEHICLES WHEN COMPLETED (1) (Does Not Apply To Vehicles Over 4536 kg [10,000 lb] GVWR)**

| Model | Wheelbase mm [inches] | Maximum Unloaded Vehicle Weights kg [pounds] |
|---|---|---|
| Van & Wagon | 3335 [129] | Low-Roof: 3629 [8000] |
| | 3759 [148] | Medium/High Roof: 3675 [8100] |
| Chassis Cab & Cutaway | 3505 [138] | 3856 [8500] |
| | 3962 [156] | |
| | 4521 [178] | |

*(1) Maximum unloaded vehicle weight values shown in this table are limits for purposes of F/CMVSS conformity only. See Emission Certification information of this manual for possible additional weight restrictions to meet emission requirements.*

**TABLE 9**

**MAXIMUM UNLOADED VEHICLE WEIGHTS (UVW) WITH SECOND UNIT BODY (SUB) ( FMVSS 301 FUEL SYSTEM COMPLIANCE )**

(Note: This information does not apply to vehicles over 4536 kg [10,000 lb] GVWR)

| Model / Cab | Frame Width | Drive | SUB Maximum CG Height above Frame mm [in] *(1)* | Maximum UVW *kg* [lb] Engine | |
|---|---|---|---|---|---|
| | | | | 6.2L Gas | 6.7L Diesel |
| **PICKUP BOX DELETE / REMOVAL** | | | | | |
| F-250/350 Regular Cab | Wide | 4x2 4x4 | *447* [17.6] | *3547* [7819] | *3515* [7749] |
| F-250/350 SuperCab | | | *610* [24.0] | *3547* [7819] | *3905* [8608] |
| F-250/350 Crew Cab | | | | | |
| **CHASSIS CAB** | | | | | |
| F-250/350 Regular Cab | Narrow | 4x2 4x4 | *447* [17.6] | *3769* [8308] | *3769* [8308] |
| F-250/350 SuperCab | | | *610* [24.0] | | |
| F-250/350 Crew Cab | | | | | |

*(1) Vertical dimensions are measured from the top surface of the frame at a distance approximately 304.8-457.2 mm [12--18 in] from the rear of the cab.*

(Cont'd next page)

**FMVSS AND CMVSS 105 HYDRAULIC BRAKE AND 126 ELECTRONIC STABILITY CONTROL SYSTEM COMPLIANCE GUIDELINES FOR F-SERIES ALTERED VEHICLES WITH A GVWR OVER 3629 kg [8000 lb] INCLUDING PICKUP BOX REMOVAL – REFER TO THE *INCOMPLETE VEHICLE MANUAL* (IVM) FOR ADDITIONAL INFORMATION**

**105 INFORMATION**

Vehicle weights and dimensional information required for center of gravity calculations are available in the *Source Book*. See your local Ford Dealer and refer to appropriate model year and specific vehicle for the required information.

The abbreviated definitions and a vehicle diagram which are required for the equations in the FMVSS 105 segment of this document are shown on the next page. The vehicle, as altered, will conform to FMVSS and CMVSS 105, Hydraulic and Electric Brake Systems, provided that:

- No alterations, modifications, or replacements are made to the following:
  - – Service or parking brake system
  - – Antilock brake system
  - – Vacuum system
  - – Wheels and tires
  - – Brake system indicator lamp and wiring
  - – Brake system reservoir labeling
  - – Suspension ride height or spring rate
  - – Hydro-boost system
  - – Power steering pump and lines if used with Hydro-boost
  - – Engine belt drive system
- Any removal of a Ford Motor Company body or chassis component is accompanied by the addition of equal weight.
- Vehicles with a GVWR of 4536 kg [10,000 lb] or less do not exceed the Maximum Unloaded Vehicle Weight value in Table 9.
- The applicable GAWRs and GVWR weights are not exceeded.
- The completed vehicle must have a vertical center of gravity (Equation E) of 48.0 inches or less when measured from the ground.
- The front axle curb weight of the completed vehicle (incomplete vehicle weight + min SUB weight, listed in Table 7, may be reduced by no more than 10% for SRW or 25% for DRW vehicles, using the front axle ground reaction as manufactured by Ford Motor Company.
- The rear axle curb weight of the completed vehicle (incomplete vehicle + min SUB weight, listed in Table 7, must be the same or greater than the rear axle ground reaction as manufactured by Ford Motor Company.

**REFERENCE:** Equation F can be used to determine the completed vehicle's horizontal center of gravity ($CG_h$). To assist with the equation, abbreviated definitions and a vehicle diagram are provided on the next page,

| SUPER DUTY F-SERIES PASSENGER LOAD TABLE | | |
|---|---|---|
| $CG_{hp}$ | GVWR [lb] | P [lb] |
| 61.9 [in] | 8500 - 10,000 | 400 |
| | 10,001 - 19,000 | 500 |

| SUPER DUTY F-SERIES PASSENGER CG*vp* | | |
|---|---|---|
| All Seats | | |
| $CG_{vp}$ | 4x2 | 4x4 |
| | 40.3 [in] | 43.8 [in] |

**EQUATION E**

$$CG_v = \frac{CG_{vb}(W_b) + CG_{vc}(W_c + W_l) + CG_{vp}(P)}{GVWR}$$

**EQUATION F**

$$CG_h = \frac{\left(W_{rb} + W_{rc} + \left(\frac{P \times CG_{hp}}{WB}\right) + W_{rl}\right) \times WB}{GVWR}$$

**Example:**

**F-250 (4x4) Pickup Box Removal with 142 inch WB and 10,000 lb GVWR**

**Known:**

F-250 (4x4), 142 inch WB, 10,000 lb GVWR, 6.2L engine pickup box removal vehicle.

$W_b$ = 675 lb
$W_{rb}$ = 600 lb
$W_{rc}$ = 2585 lb
$W_c$ = 6489 lb
$CG_{vb}$ = 35 inches
$CG_{vc}$ = 31.0 inches
$W_l$ = GVWR - ($Wb$ + $Wc$ + 400) = **2436 lb**

$$W_{rl} = \frac{(Cghl)\ Wl}{WB} = \frac{(137)\ 2436}{142} = \mathbf{2350\ lb}$$

**From Equations E & F:**

$$CG_v = \frac{35(675) + 31(6489 + 2436) + 43.8(400)}{10{,}000} = \mathbf{31.8\ in}$$

$$CG_h = \frac{(600 + 2585 + \frac{400(61.9)}{137} + 2350) \times 142}{10{,}000} = \mathbf{81.1\ in}$$

Since $CG_v$ is less than 48" and $CG_h$ is less than 142", this vehicle is acceptable with the 675 lb SUB.

| If $CG_v$ exceeds 48", do one or more of the following, as required, to get $CG_v \leq$ 48" | If $CG_h$ exceeds wheelbase, do one or more of the following, as required, to get $CG_h \leq$ WB |
|---|---|
| 1. Move heavy objects to lower areas to lower the CG. | 1. Move heavy objects forward to shift the CG forward. |
| 2. Remove heavy objects with CG greater than 48" above the ground. | 2. Remove heavy objects which are aft of the rear axle. |
| 3. Add weight as low as possible (lower than 48") to bring down the CG. | 3. Add weight as far forward as possible (forward of the rear axle) to shift the CG forward. |

(Cont'd next page)

**F/CMVSS 105 HYDRAULIC BRAKE SYSTEMS AND 126 ELECTRONIC STABILITY CONTROL SYSTEMS COMPLIANCE GUIDELINES FOR F-SERIES ALTERED VEHICLES WITH A GVWR OVER 3629 KG [8000 LB] INCLUDING PICKUP BOX REMOVAL – REFER TO THE *INCOMPLETE VEHICLE MANUAL* (IVM) FOR ADDITIONAL INFORMATION (Cont'd)**

P = Passenger load.

CGv = Vertical distance from the ground to the center of gravity of the completed vehicle [inches].

CGh = Horizontal distance from ℄ of the front wheels to completed vehicle center of gravity [inches].

CGvb = Vertical distance from the ground to the center of gravity of the SUB and/or permanently attached equipment [inches].

CGvc = Vertical distance from the ground to the center of gravity of the chassis (including cab if original equipment) [inches].

CGhp = Horizontal distance from the ℄ of the front wheels to the P (passenger load) [inches].

CGvp = Vertical distance from the ground to the center of gravity of the front and rear seat P (passenger load) [inches].

Wb = Weight of the SUB and/or permanently attached added equipment [pounds].

Wrb = Weight on the rear wheels of the SUB and/or permanently attached added equipment [pounds].

Wrc = Weight at the rear wheels of the vehicle (chassis and cab) (fuel tanks full), including option weight [pounds].

Wc = Weight of the vehicle (chassis and cab) (fuel tanks full), including option weight [pounds].

WB = Vehicle wheelbase [inches].

Wt = Total unladen weight = (Wb + Wc + P) [pounds]

GVWR= Gross Vehicle Weight Rating of the vehicle [pounds].

Wl = Remaining cargo capacity [pounds].
Where: Wl = GVWR – (Wb + Wc + P)

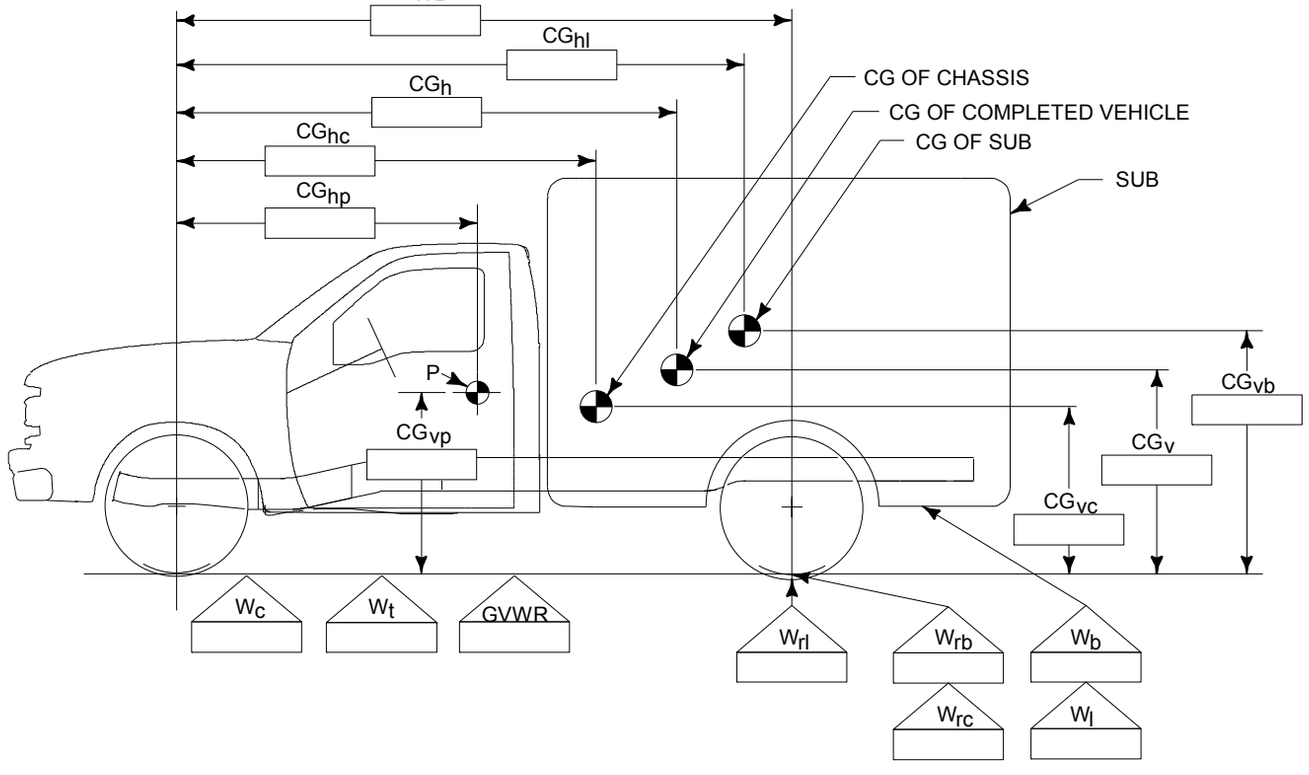
Wrl = Weight of the remaining cargo capacity on the rear wheels [pounds].

$$Wrl = \frac{(CGhl)\ Wl}{WB}$$

CGhc = Horizontal distance from the ℄ of the front wheels to the center of gravity of the chassis [inches].

CGhl = Horizontal distance from the ℄ of the front wheels to the cargo center of gravity [inches]. For many common vehicles, if the CGhl is not given in the table, then it may be estimated as the distance from the ℄ of the front wheel to the horizontal midpoint of the cargo area.

SUB = A Second Unit Body consists of the body structure and/or all the cargo carrying, work performing and/or load bearing components and/or equipment installed by a subsequent stage manufacturer on an incomplete vehicle, such that the incomplete vehicle becomes a completed vehicle.

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# SAFETY / EMISSIONS
# U.S. AND CANADA SAFETY STANDARDS (Cont'd)



## INCOMPLETE VEHICLE MANUALS

Each Ford Motor Company incomplete vehicle product is accompanied by an Incomplete Vehicle Manual (IVM) (see manuals on this page). These manuals contain the information required to comply with Part 568 of Title 49 of the Code of Federal Regulations for vehicles offered for sale in the United States and with Section 6 of the Canadian Motor Vehicle Safety Regulations for vehicles offered for sale in Canada. Ford Motor Company incomplete vehicles offered for sale in the United States and Canada will be provided with an Incomplete Vehicle Manual.

The manual must be forwarded with the vehicle until the final stage manufacturer has installed a Safety Compliance label on the completed vehicle.

## INCOMPLETE VEHICLE MANUAL COVER

The cover of the IVM identifies the incomplete vehicle configurations for which compliance representations are identified. Also, a label is affixed to the cover which includes the Vehicle Identification Number (VIN) for the specific vehicle to which the manual belongs. The label identifies the following information which pertains only to the vehicle with the corresponding VIN:

- The GVWR
- The front and rear GAWRs
- Tire and wheel size
- Cold tire inflation pressure (PSI)
- Completed vehicle type(s) into which the incomplete vehicle may be manufactured
- Optional Prep Package when the vehicle is so equipped

## INCOMPLETE VEHICLE LABEL

Each incomplete vehicle as manufactured by Ford Motor Company, will have an incomplete vehicle label affixed to the driver-door lock pillar. The sample labels on this page are typical of those provided for U.S. production. A detailed explanation of all label information is available in the *Ford Truck Source Book* for the appropriate model year, at your local Ford Dealer.

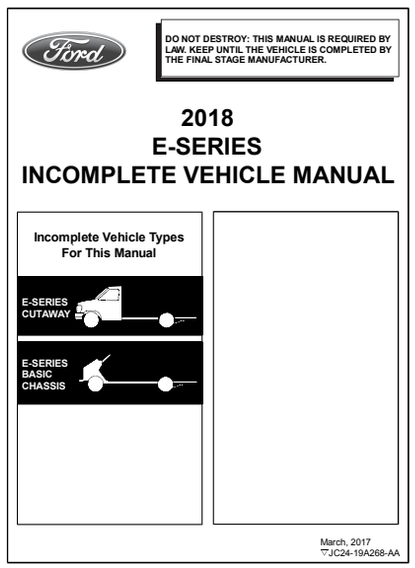
The 5th, 6th & 7th digits of the Vehicle Identification Number (VIN) will identify the incomplete vehicle type. VIN information is available in the *Ford Truck Source Book* for the appropriate model year.

California Air Resources Board (CARB), requires a Vehicle Emission Control Label with a vehicle identification number (VIN) having a non-contact, bar-code reading wand capability. The bar-code directly below the VIN on the incomplete vehicle label will comply with this regulation.

## OPTIONAL PREP PACKAGES

Incomplete vehicles produced by Ford Motor Company, in some instances, are equipped with optional Prep Packages.

If an incomplete vehicle is equipped with an optional Prep Package, both the incomplete vehicle label affixed to the vehicle and the label on the front of the IVM will identify the Prep Package.


DO NOT DESTROY: THIS MANUAL IS REQUIRED BY LAW. KEEP UNTIL THE VEHICLE IS COMPLETED BY THE FINAL STAGE MANUFACTURER.
2018
E-SERIES
INCOMPLETE VEHICLE MANUAL
Incomplete Vehicle Types For This Manual
E-SERIES CUTAWAY
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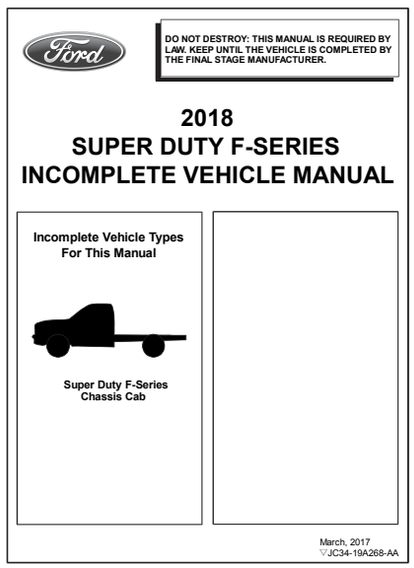
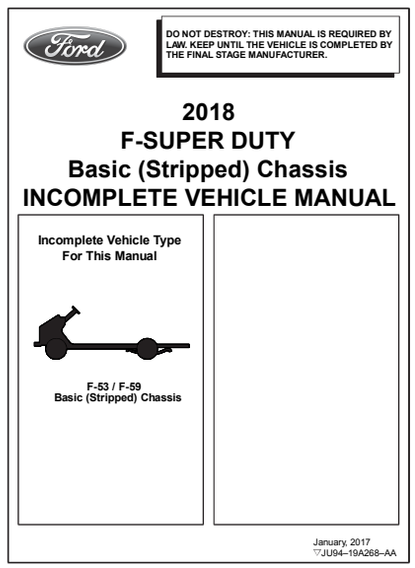
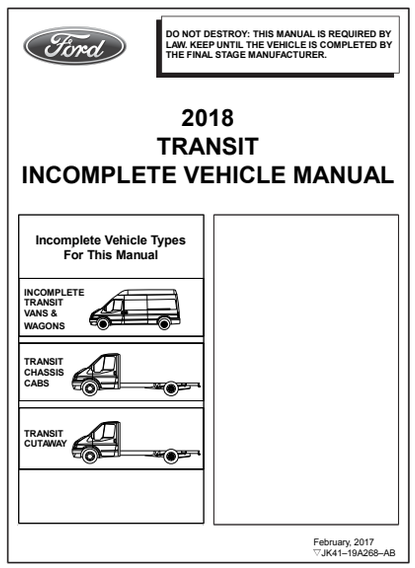
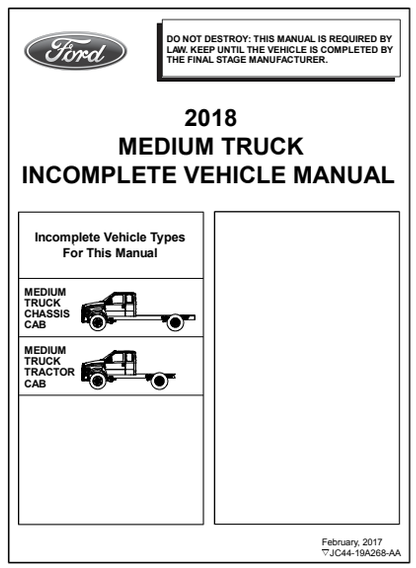
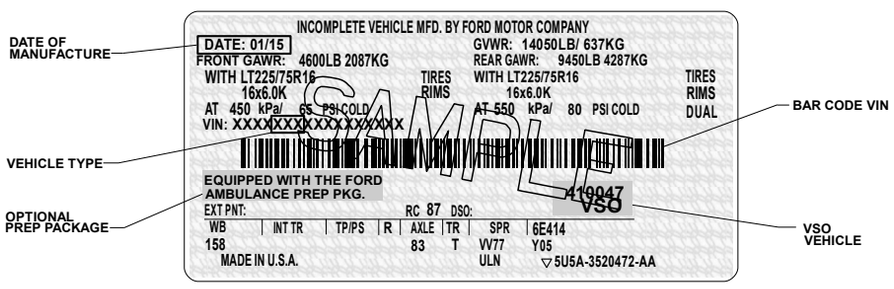
March, 2017
▽JC24-19A268-AA


DO NOT DESTROY: THIS MANUAL IS REQUIRED BY LAW. KEEP UNTIL THE VEHICLE IS COMPLETED BY THE FINAL STAGE MANUFACTURER.
2018
SUPER DUTY F-SERIES
INCOMPLETE VEHICLE MANUAL
Incomplete Vehicle Types For This Manual
Super Duty F-Series Chassis Cab
March, 2017
▽JC34-19A268-AA

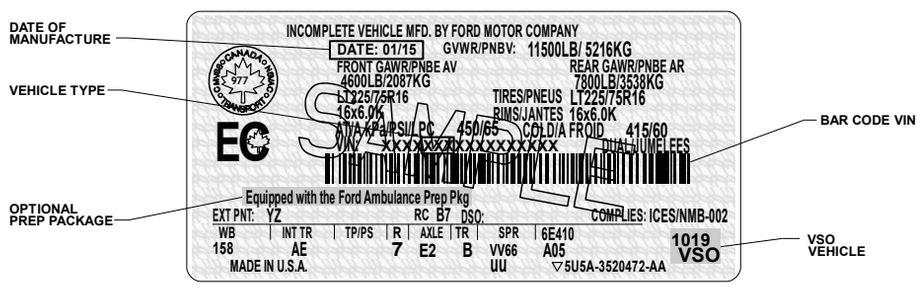

DO NOT DESTROY: THIS MANUAL IS REQUIRED BY LAW. KEEP UNTIL THE VEHICLE IS COMPLETED BY THE FINAL STAGE MANUFACTURER.
2018
F-SUPER DUTY
Basic (Stripped) Chassis
INCOMPLETE VEHICLE MANUAL
Incomplete Vehicle Type For This Manual
F-53 / F-59 Basic (Stripped) Chassis
January, 2017
▽JU94–19A268–AA


DO NOT DESTROY: THIS MANUAL IS REQUIRED BY LAW. KEEP UNTIL THE VEHICLE IS COMPLETED BY THE FINAL STAGE MANUFACTURER.
2018
TRANSIT
INCOMPLETE VEHICLE MANUAL
Incomplete Vehicle Types For This Manual
INCOMPLETE TRANSIT VANS & WAGONS
TRANSIT CHASSIS CABS
TRANSIT CUTAWAY
February, 2017
▽JK41–19A268–AB


DO NOT DESTROY: THIS MANUAL IS REQUIRED BY LAW. KEEP UNTIL THE VEHICLE IS COMPLETED BY THE FINAL STAGE MANUFACTURER.
2018
MEDIUM TRUCK
INCOMPLETE VEHICLE MANUAL
Incomplete Vehicle Types For This Manual
MEDIUM TRUCK CHASSIS CAB
MEDIUM TRUCK TRACTOR CAB
February, 2017
▽JC44-19A268-AA


DATE OF MANUFACTURE
VEHICLE TYPE
OPTIONAL PREP PACKAGE
BAR CODE VIN
VSO VEHICLE
INCOMPLETE VEHICLE MFD. BY FORD MOTOR COMPANY
DATE: 01/15
GVWR: 14050LB/ 637KG
FRONT GAWR: 4600LB 2087KG
REAR GAWR: 9450LB 4287KG
WITH LT225/75R16 16x6.0K TIRES RIMS
AT 450 kPa/ 65 PSI COLD
WITH LT225/75R16 16x6.0K TIRES RIMS DUAL
AT 550 kPa/ 80 PSI COLD
VIN: XXXXXXXXXXXXXXXXX
EQUIPPED WITH THE FORD AMBULANCE PREP PKG.
EXT PNT:
RC 87 DSO:
WB | INT TR | TP/PS | R | AXLE | TR | SPR | 6E414
158 | | | | 83 | T | VV77 | Y05
MADE IN U.S.A.
ULN
▽5U5A-3520472-AA
4119047
VSO
SAMPLE

TYPICAL E-SERIES – U.S.




TYPICAL E-SERIES – CANADA